ZORKI 4
REPAIR MANUAL

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Sefa Kadirogullari Photography
S.K Camera Repair

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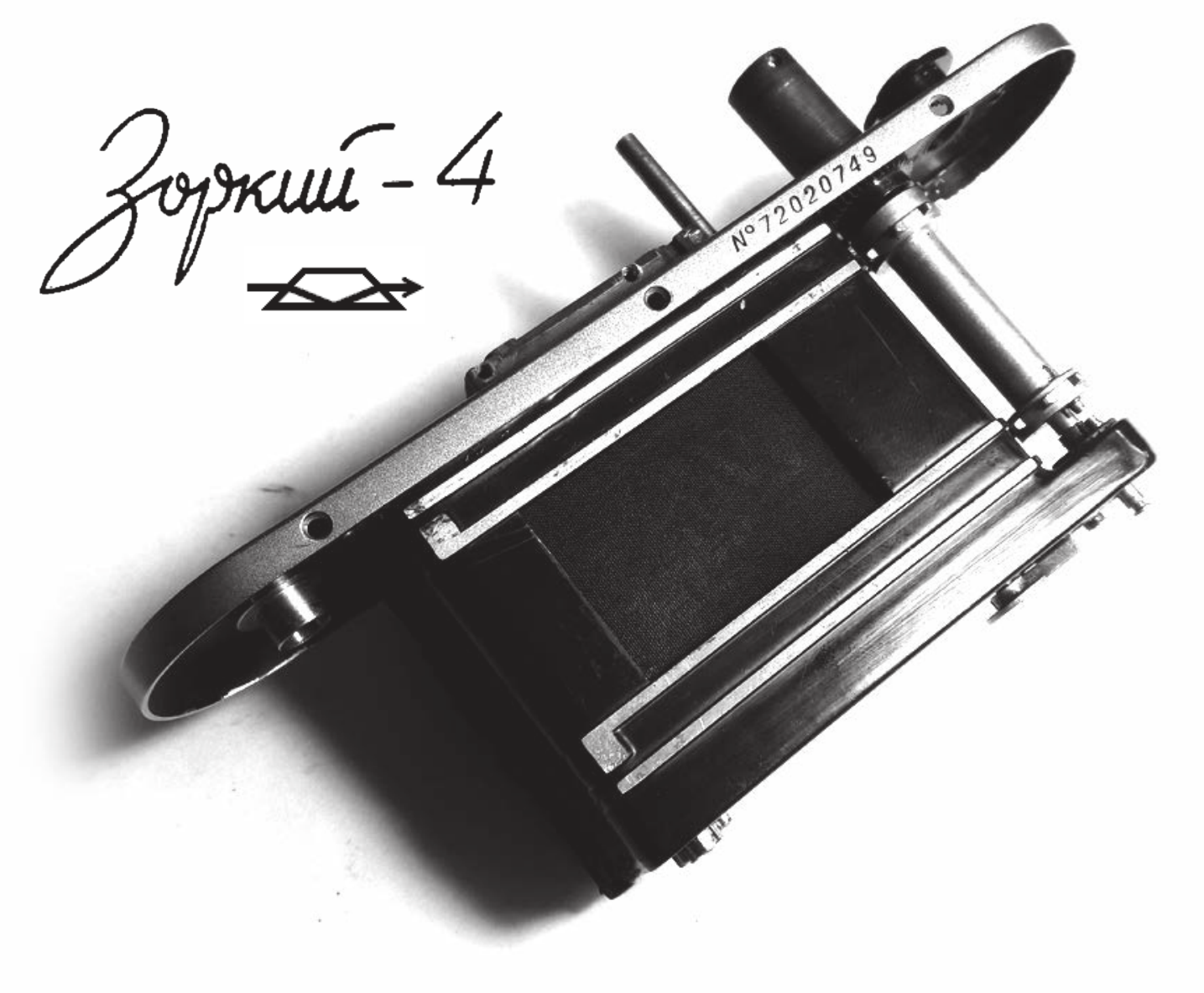
Table of Contents

Introduction.....5
Disassembly.....6
Top cover.....6
Winding knob.....7
Flash sync dial.....8
Shutter speed dial.....8
Shutter release.....9
Under the cover.....10
Flash sync unit.....10
Slow speed escapement.....11
Functionality of the shutter and escapement.....12
Brake latch.....14
Speed selector.....15
Speed dial.....16
Rangefinder mechanism.....18
Rewind knob.....21
Body.....22
Lens mount.....22
Shell.....23
Lens mount base.....24
Light baffles.....25
Release spring.....26
Shutter.....27
Removing the shutter crate.....27
Removing the block and delay arm.....29
Removing shutter curtains.....31
Curtain orientation.....35
Replacing curtains and ribbons.....36
Shutter curtain and ribbon dimensions.....37
Cleaning and lubricating roller springs.....38
Cleaning and lubricating the drum.....40
Shutter crate.....43
Shutter assembly.....44
Camera reassembly.....48
Lubrication and adjustments.....52
Slow speed escapement.....52
Disassembly and cleaning.....92
Rewind knob.....54
Winding mechanism.....57
Flash sync unit.....55
Self timer.....61
Flange distance.....73
Rangefinder calibration.....76
Vertical alignment.....76
Adjustment.....77

1 meter adjustment....78
Infinity adjustment....79
Ground glass check....81
Disassembly of the rangefinder mechanism....84
Shutter speed adjustment....100
Common issues....100
Shutter speed examples....101
Troubleshooting chart....103
Results....105

Introduction

I hope this guide will be of great use to those who are aiming to bring life back to their camera. This manual can also be used with previous or later Zorki / Fed rangefinder cameras to adjust the shutter, rangefinder, and flange. If you have a problem with your camera, please visit the troubleshooting chart at the end of the manual first. This may help determine the cause of your cameras issue and will hopefully save you a lot of time before you decide to start removing everything. My contact information can be found at the end of the manual. You may follow my work or even contact me if you have any questions. Thanks for reading and remember, work smart, and most importantly, work slow!



Disassembly

Top cover

A set of screws can be seen around the top cover. Two in the front, two in the back (some Zorki 4 models have only one screw on the back). However, the one located near the viewfinder does not need to be removed. This particular screw is linked to the range-finder mechanism and will be covered later on in the lesson.

Do not force any screws out if they do not seem to turn. First, find out the reason behind the problem. Corrosion can be a common issue. Using a bit of cleaning fluid can free these parts. Please work carefully with fluids and avoid spilling anything into the camera as this may cause damage to some important components.

Winding knob

A slight turn of the knob may be required in order to access the screw. Removing the screw on the exposure counter is not required, but is optional if cleaning or adjusting is intended. If the exposure counter is not adjustable by thumb, loosen the screw slightly until the counter can be adjusted again.

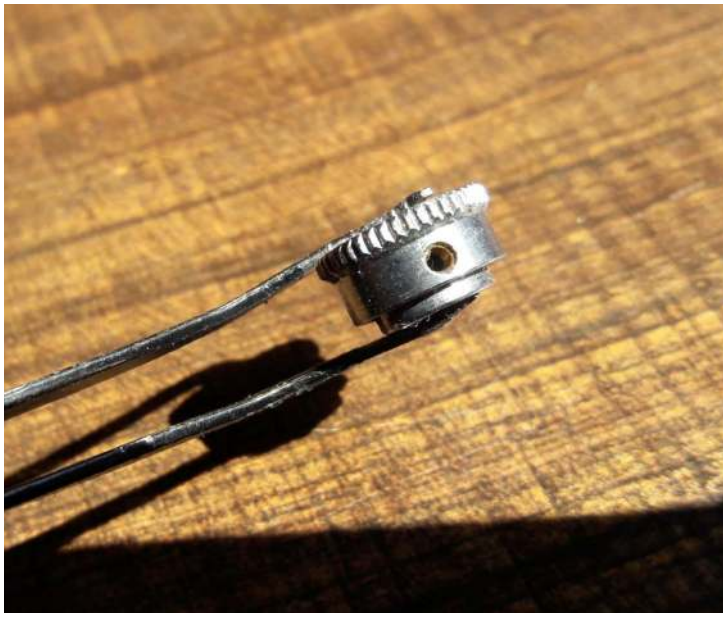
The winding knob can be removed by turning it counter-clock wise. Two more screws will be revealed after removal. You'll need to remove them as well.

Flash sync dial

Please note the position of the flash sync dial (ring around the shutter speed dial). Make sure to set the flash sync dial to “O” or “X” (later models) before removing the set screw inside (circled in red). Not doing so will upset the position of the flash sync unit located underneath the case resulting in a non-working flash. If the flash sync does not work, skip to page 55 for adjustment.

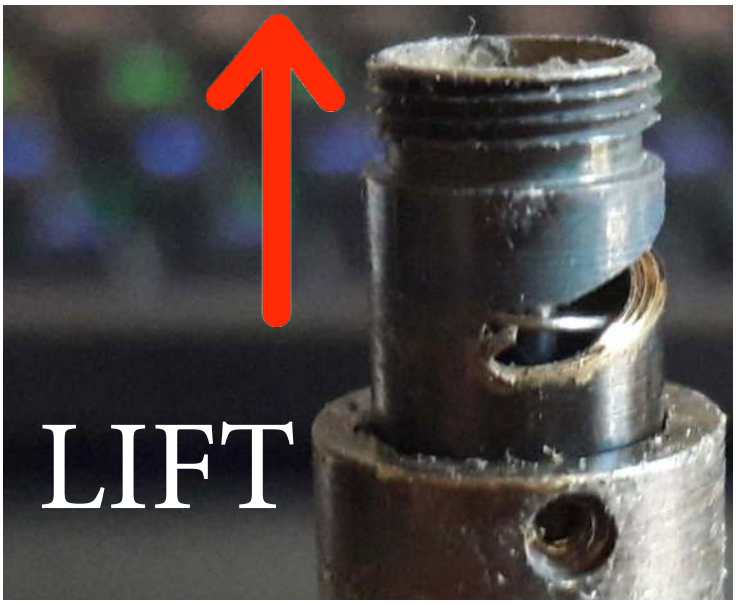
Shutter speed dial

Remove the shutter speed dial from the two retaining screws. The screws do not need to be completely removed, nor taking note of the current shutter speed would be necessary. The speed dial orientation will be explained later for this reason. At this point, you can carefully lift top cover off.

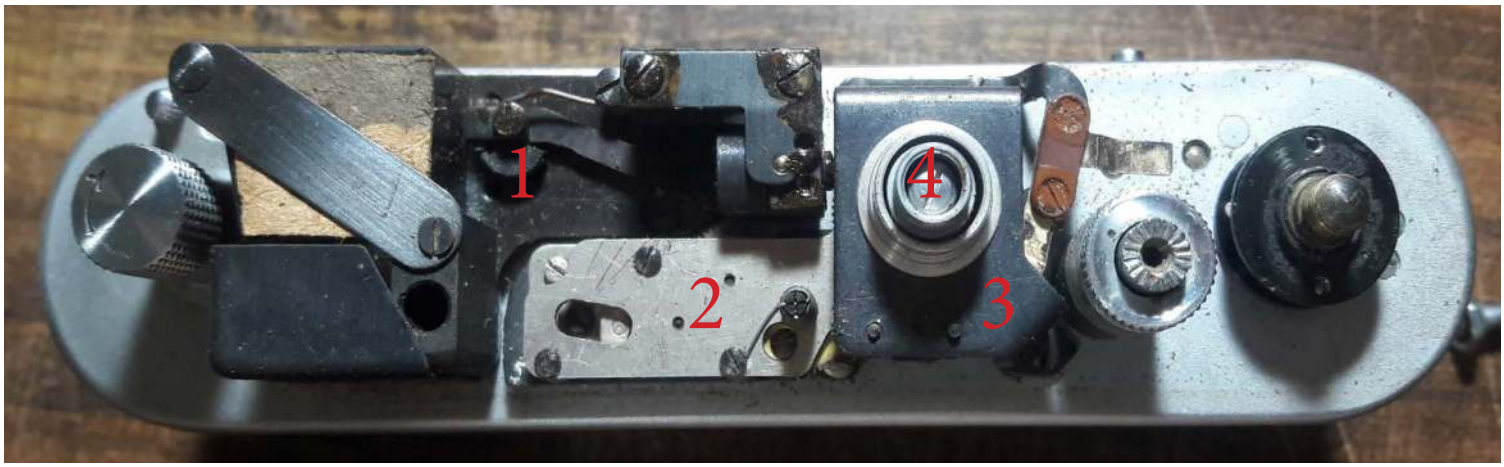


Shutter release

The shutter release does not need to be removed, but sometimes cleaning may be necessary, since dried lubricants and dirt can sometimes cause issues. To the side of the collar on the shutter release, there should be a tiny screw. Remove it then turn the collar CCW until it comes off. Next, remove the screw on the base of the shutter release and lift away. Clean and lubricate everything, including the interior portion.



Under the cover



Under the cover you'll find:

1) Rangefinder focusing mechanism

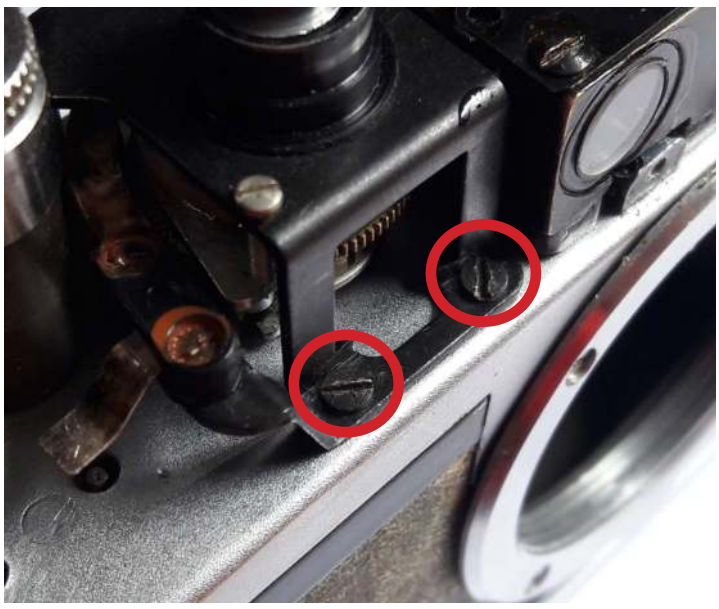
2) Slow Speed escapement, controls speeds 1/15 - 1 second

3) Flash sync unit

4) Shutter speed selector

Flash sync unit

The flash sync unit should come off first. A total of 3 retaining screws can be found. Two in the front, one in the back (near the shutter release). Please do not alter the flash sync unit setting after removal.



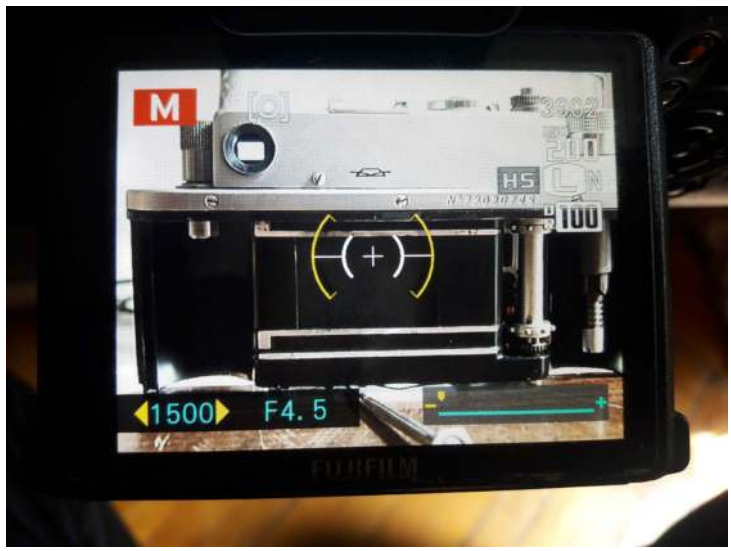
Shutter speed adjustment

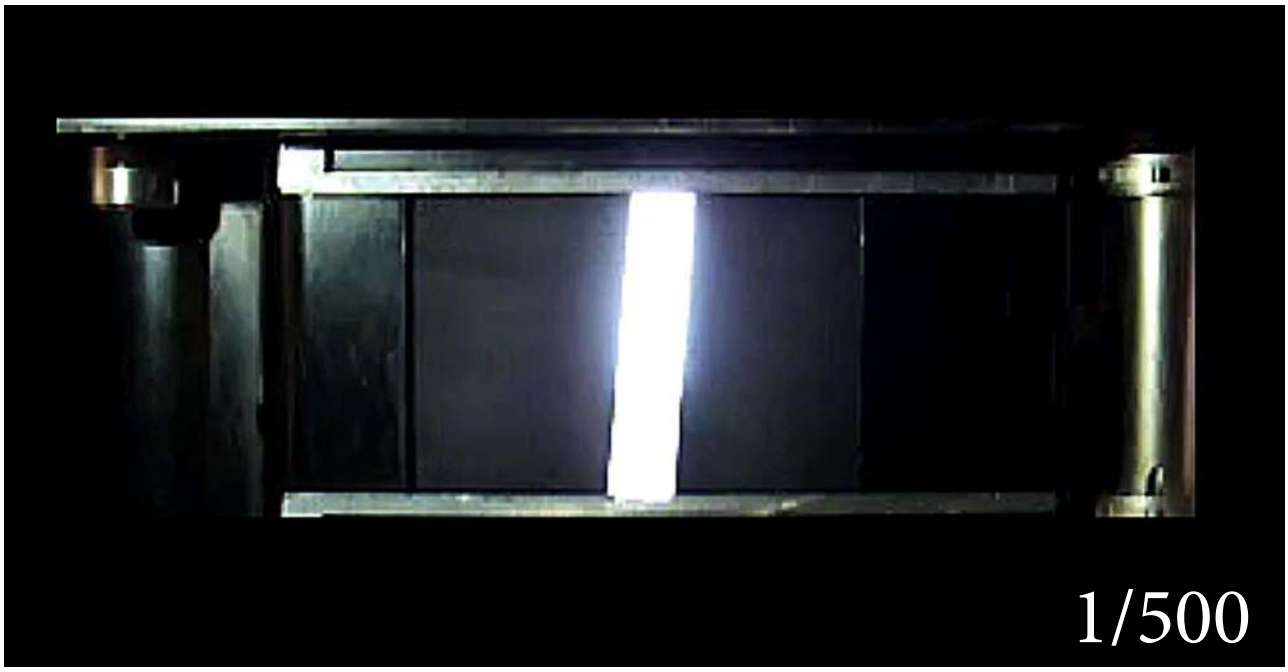
The spring rollers in the shutter need to be properly tensioned in order to deliver correctly timed exposures. Too much or less tension will result in incorrect exposures. Capping or banding will be a result of this. Capping produces partially exposed frames whereas banding produces irregular curtain travel. Incorrect curtain installation can also lead to shutter capping. Below you can find a few examples of improper curtain adjustment.

Capping example

Banding example

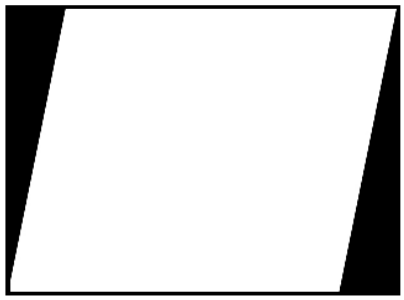
Partially exposed frames occur when the closing curtain roller is tensioned too much. This leads to the closing curtain traveling faster than the opening curtain. Capping happens at higher speeds usually between 1/500 and 1/1000. Banding is most obvious at speeds of 1/60 and higher. Speeds 1/30 and below are not affected due to the timed operation executed by the brake latch (1/30 position on the SS dial) and escapement. Dried lubricants or dirt will also play a part in shutter malfunction. Disassembly, cleaning, and lubricating may be required if shutter is still acting up even after adjustment.





There are several tools and ways to calibrate the shutter, but I will not be covering any of these. An Arduino based DIY shutter speed tester can be constructed or a speed tester tool can be simply purchased online if you're looking to get accurate readings. However, I will be using a slow speed option on my digital camera, which I believe should be available to everyone (phones, digital cameras etc). This method does a visually good job at helping you determine the gaps between two the curtains during shutter travel. Below you can find examples of the speeds 1/30 - 1/1000. On each speed during travel, the curtain alignments, or the exposed portion of the frame, should match the illustrations. Remember, film can be very forgiving when it comes to overexposing, so it will compensate for the slightly incorrect shutter adjustment, if this is the case.

1/30



1/60

1/125

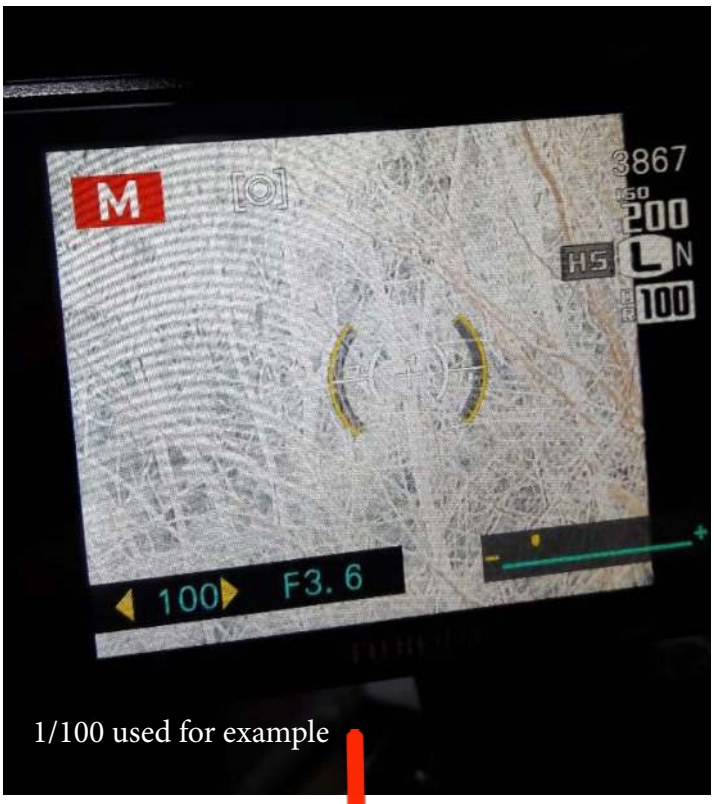
1/250

1/500

1/1000

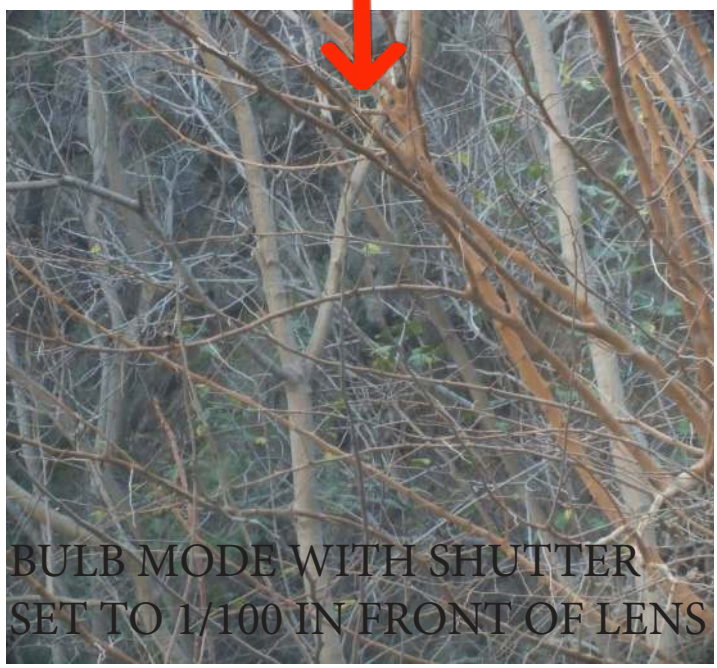
Second method

Shutter speeds can also be checked simply by firing the shutter in front of a digital cameras lens while bulb mode is running. On a digital camera, set the shutter speed to 1/1000. Other speeds can be tested later since 1/500-1/1000 are critical points for many errors (check faster speeds first). Adjust the fstop and ISO as needed and take a picture. This will be the example image for adjusting later. Now, set the digital camera to bulb mode with the exact same fstop and ISO. Place the Zorki's shutter in front of the lens, hold down bulb, release the shutter at 1/1000, and end the bulb exposure. If done correctly, you should either get an under, over, or even exposure. No exposure might be another possibility as well. Compare your Zorki's exposure to the example image and adjust until both exposures are exact, or close enough. Capping, banding, and even curtain bounce can be resolved by using this method.



1/100 used for example

1/100 - DIGITAL

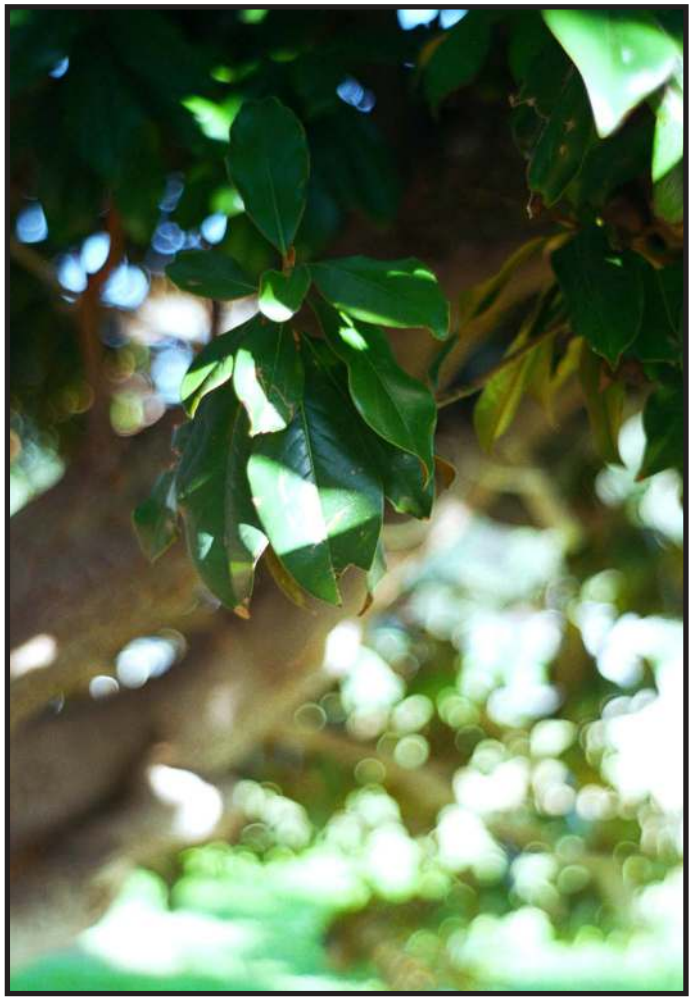

BULB MODE WITH SHUTTER SET TO 1/100 IN FRONT OF LENS

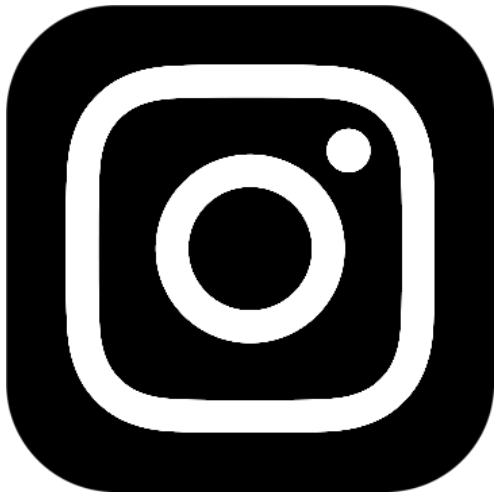
Malfunction	Reason	Fix
Shutter speeds do not work	• Speed selector has come loose. • Brake latch missing or loose	• Screw down the speed selector. • Insert brake latch and spring
Bulb or “B” mode does not work.	Brake latch is too high, spring may be loose.	Screw down the brake latch spring.
Shutter stays open on “B” mode and doesn’t close.	• Brake latch is stationed too low • Spring may have become weak or loose • Brake latch may be bent • Release spring loose	• Insert original spacer below brake latch. • Remove spring, flatten / fix, screw down spring. • Unbend brake latch • Fasten release spring
Shutter doesn’t work on speeds B, 1/30, 1/60, and on speeds operated by the slow speed escapement (slower speeds).	Dried and thickened grease in the shutter.	Disassembly of the shutter and rollers, cleaning and lubricating required.
Timings of speeds 1/15, 1/8, 1/4, 1/2, 1 sec are incorrect.	• Escapement gear pin position is incorrect. • Escapement mechanism is stationed incorrectly. • Escapement gear turned less than 1 revolution.	• Unscrew ring on escapement gear, align gear pin to correct position, pg 52. • Shift escapement, shifting back will decrease timing, shifting forward will increase timing. • Remove escapement mechanism, turn gear 2 revolutions (factory setting is 3 revolutions), and install.
Shutter does not release	• Brake latch may be rubbing up against shutter drum. • Bits of film between gears. • Center light baffle • Shutter tension	• Remove brake latch, fire shutter, and reinsert brake latch. • Remove the shell and clean all accessible gears. • Adjust light baffle • Adjust shutter tension
Uneven exposures, capping and banding occurring.	Closing curtain catches up to the opening curtain, speeds are incorrect.	Reduce tension of the second curtain or strengthen the tension of the first curtain, adjust SS

Rangefinder calibrated, but photos are still blurry.	Flange distance is incorrect.	Remove lens mount, add / remove shims, measure flange distance. Flange distance: 28.80mm +- .02
Flange is correct, but focus is still blurry.	Rangefinder may be out of alignment.	Calibrate the rangefinder, 1 meter adjustment via RF cam, infinity adjustment via horizontal setting screw (near viewfinder).
Shutter does not wind, winding mechanism continues to turn freely.	• Release spring loose or absent • Bulb lock mode enabled. • Mechanism switched to film rewind mode. • Escapement gear pin and selector pin jammed	• Screw down release spring. • Turn shutter release button CW. • Turn ring around shutter release CCW. • Check slow speed escapement
Shutter jams during release, closing curtain does not travel	• Slow Speed escapement gear pin slippage. • Brake latch malfunction. • Center light baffle causing friction • Shutter tension	• Remove and readjust slow speed escapement • Remove and reinsert brake latch • Set camera to “B”, release and shutter continue to hold shutter, adjust light baffle from film plane window. • Adjust shutter tension
Shutter stays open on all speeds.	Slow speed delay arm engaged.	Insert toothpick between delay arm and screw, speeds will not work with out slow speed escapement inserted and adjusted, check snail cam
Flash sync does not work.	Flash sync unit setting is incorrect.	Please see page 55 for flash sync adjustment.
Viewfinder looks “dreamy” or distorted.	Diopter glass is bent.	Remove top case, remove rear cover of RF viewfinder, reshape diopter.

Results

With everything correctly adjusted and lubricated, the Zorki 4 should deliver some outstanding results. Here are a few examples I took with my Zorki 4 (not the camera used in this guide) before I decided to switch to the Zorki 1. These photos were taken with a 1963 Jupiter 8 50mm F2 lens. Films used: Ilford FP4 125, Ilford PAN 400, Fuji C200.





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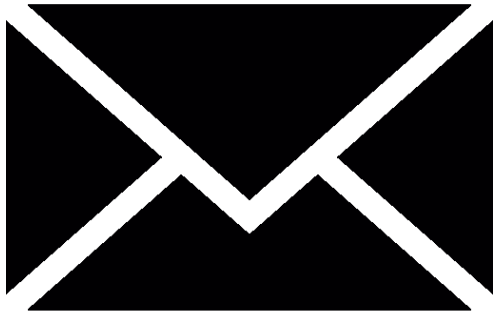

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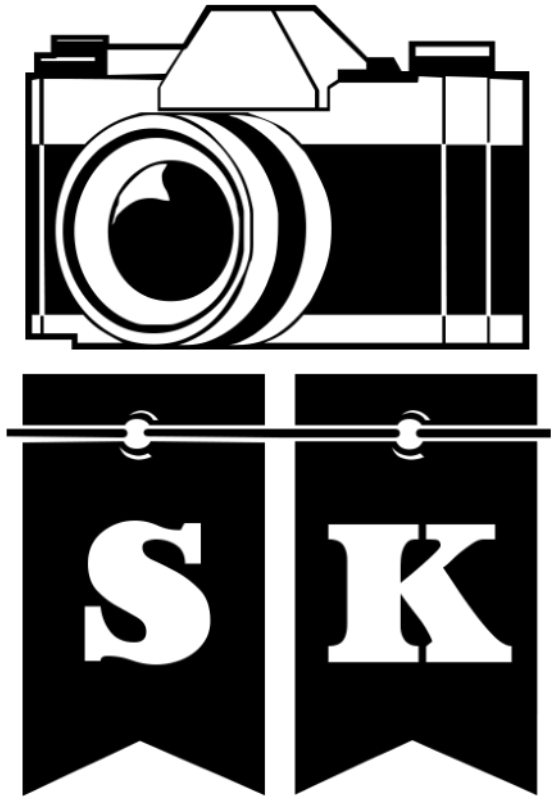
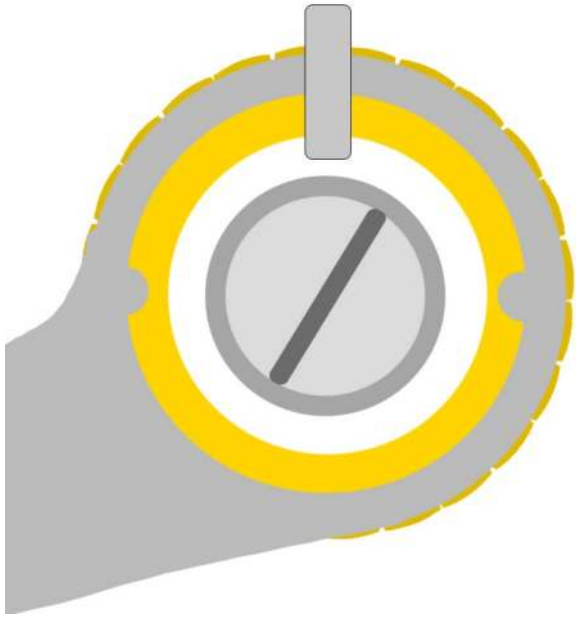
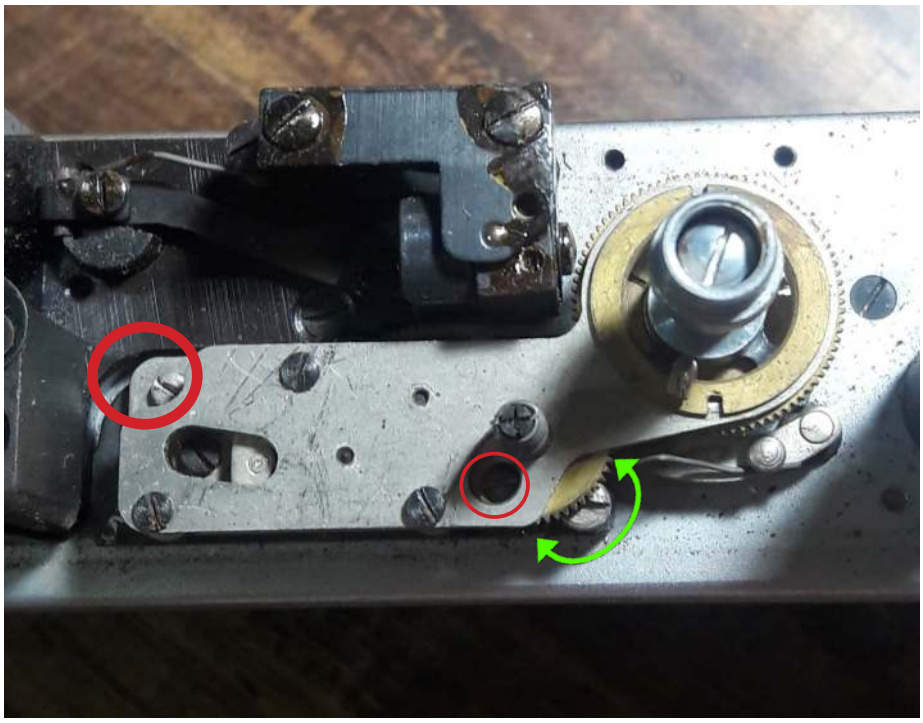


Slow speed escapement

Before the slow speed escapement can be removed, the L shaped hook on the speed dial must face the 12 o'clock position. Not aligning the L shaped hook at the 12 o'clock position will give you trouble removing the mechanism. If the shutter is fully cocked, then the L shaped hook would be facing the 9 o'clock position. Release the shutter if it's facing the 9 o'clock position. If the shutter is not cocked, then the L shaped hook will be facing the 7 o'clock position. Add back on the winding knob and align the hook.

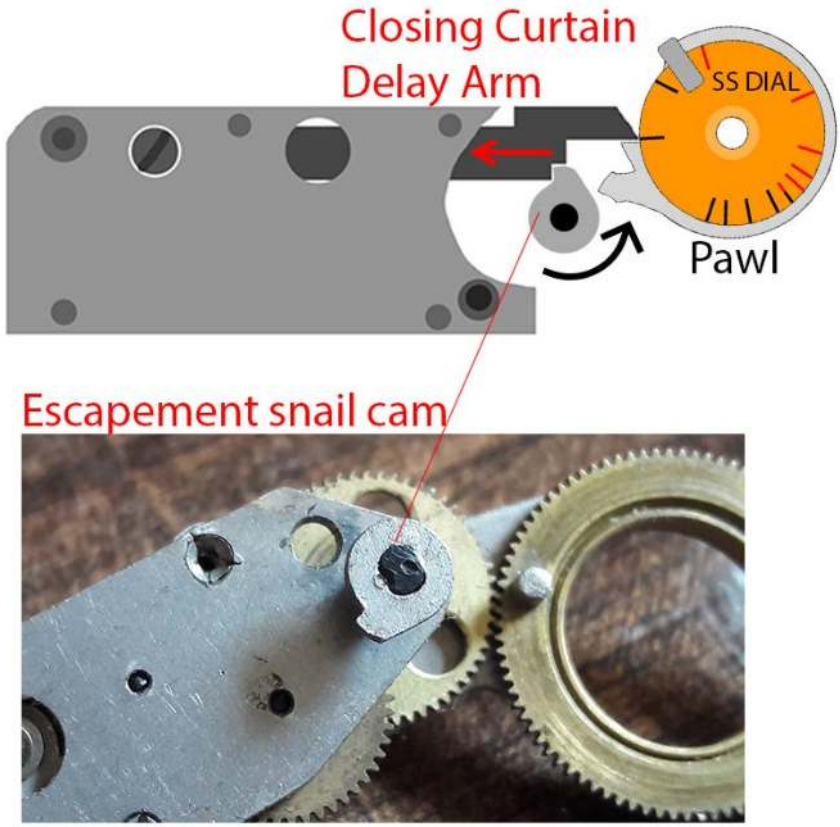


The slow speed escapement has two retaining screws (circled in red) with one of them being under a gear. A slight shift of this gear will help you remove it. As the escapement is lifted off the body, it will start to buzz. This is a sign of a reset. It can be readjusted later. Please see pages 52-53 for more information.



Functionality of the shutter and escapement

Without the slow speed escapement mechanism the shutter would always stay open during release. The snail cam below the escapement keeps the delay arm (below the block) in the open position when faster speeds are selected and is in the closed position when slower speeds are selected (timed operation, speeds 1/15 - 1 sec). However, if the delay arm was removed, the camera would of course continue to operate, but only with faster speeds. In any case the escapement has been damaged this form of “downgrade” will help maintain the functionality of the camera. Luckily, the slowest speeds that would still continue to function would be 1/60 and 1/30. These speeds do not engage the escapement mechanism, but are still considered slow speeds.



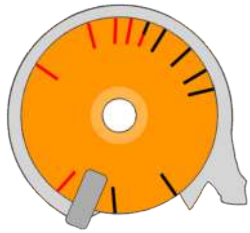
The block, closing curtain delay arm, SS dial, and pawl all rest below the escapement

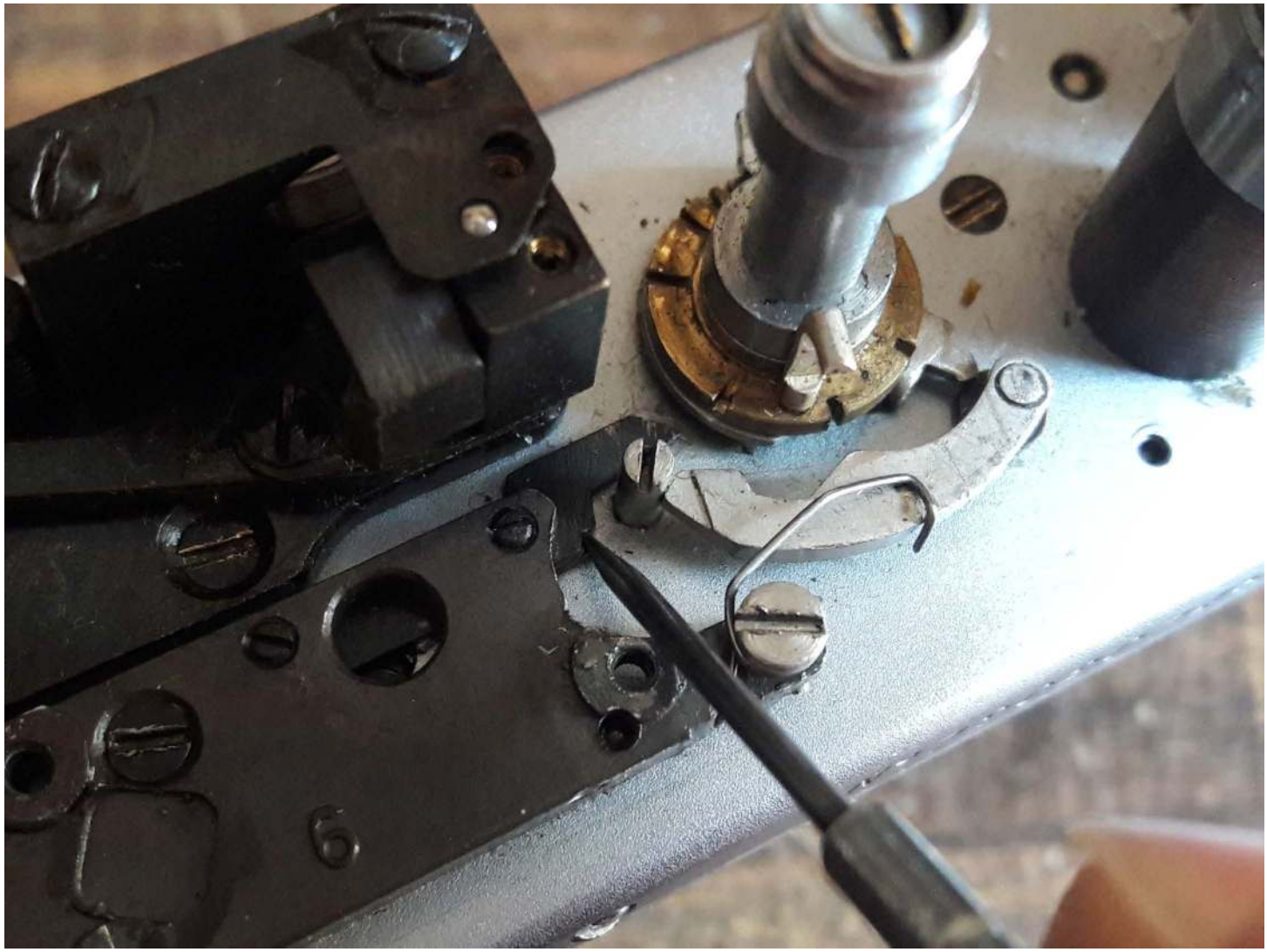
How the shutter works: When the shutter is released, the pawl (controls the closing curtain) will catch on to the brake latch (see page 14). This will happen no matter what speed is selected. The SS dial (controls the opening curtain) will unwind and the speed selector cam, whose position is set by the SS dial, will shift the brake latch. When the brake latch is shifted, the pawl will unwind completing the exposure. Shutter speeds depend merely on the starting position of the speed selector cam. However, with a slower speed selected (escapement engaged), the delay arm will block the pawl from unwinding until the timed escapement snail cam shifts the delay arm out of the way.

SS DIAL
1st curtain
(Opening curtain)

PAWL
2nd curtain
(Closing curtain)

Released
Position



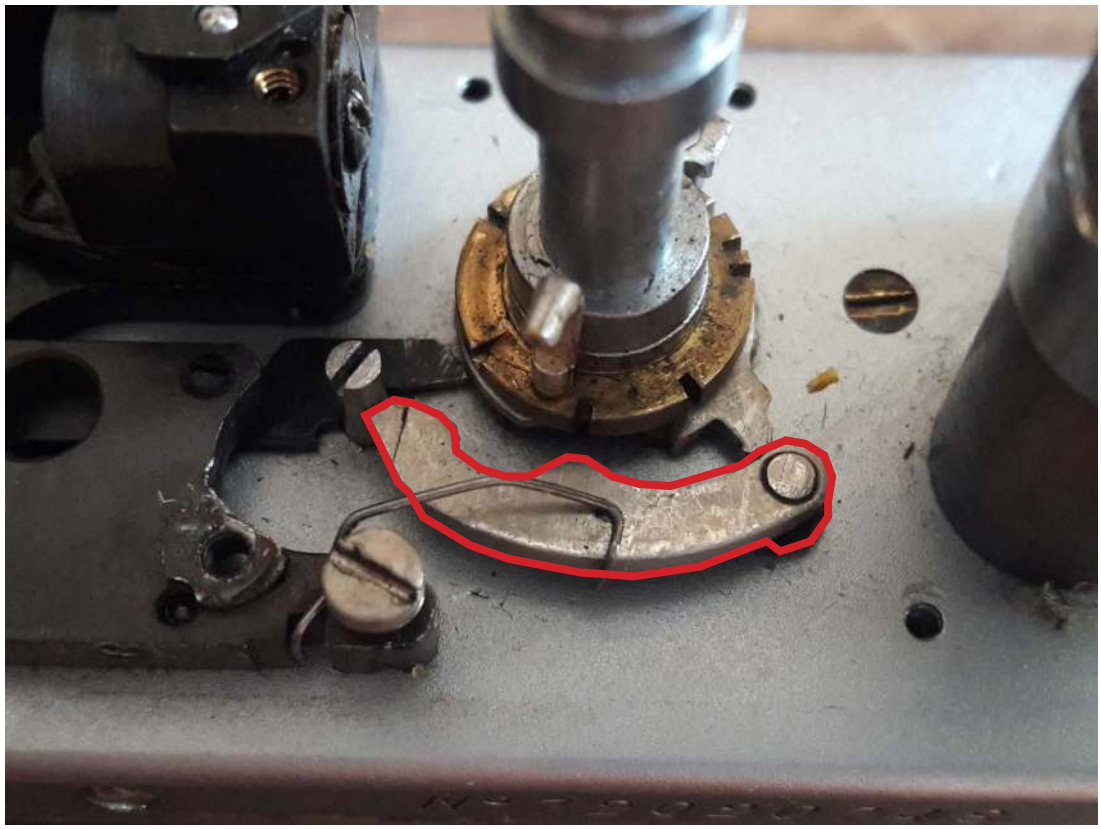


If the shutter is stuck open, a gentle shift of the delay arm will close the closing curtain. Please be aware that leaving the shutter cocked for a certain period of time may weaken the shutter springs. Replacement of the roller springs or over compensation may be required during shutter speed adjustment.

To work comfortably and avoid manually shifting the delay arm at each release, a piece of a toothpick can be inserted between the delay arm and stop screw. Removing the delay arm won't be necessary as it can be quite difficult to put back together. See page 29 for more information.

Brake latch

The brake latch is another piece that plays an important role in the functionality of the shutter. The brake latch is meant to delay the pawl (closing curtain) according to the position of the speed selector cam on the SS dial, along with activating the bulb mode. Without the brake latch in, or installed correctly, the shutter speeds would never function.

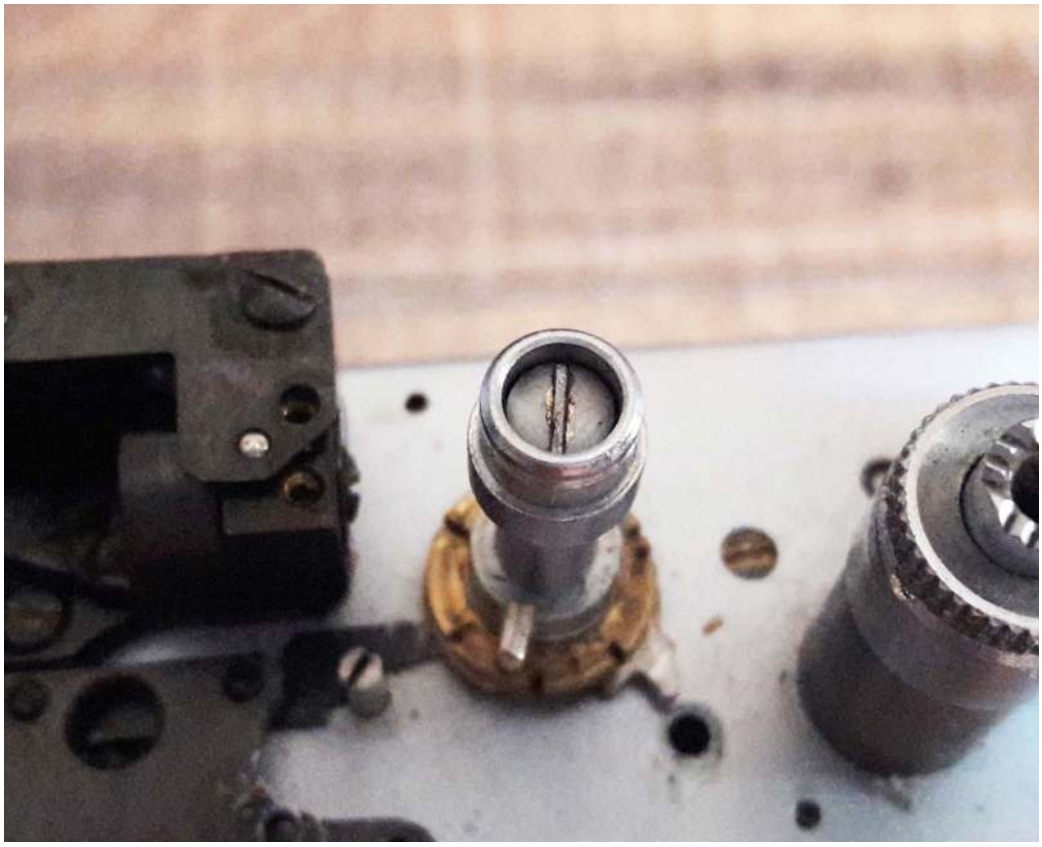


Removing the brake latch

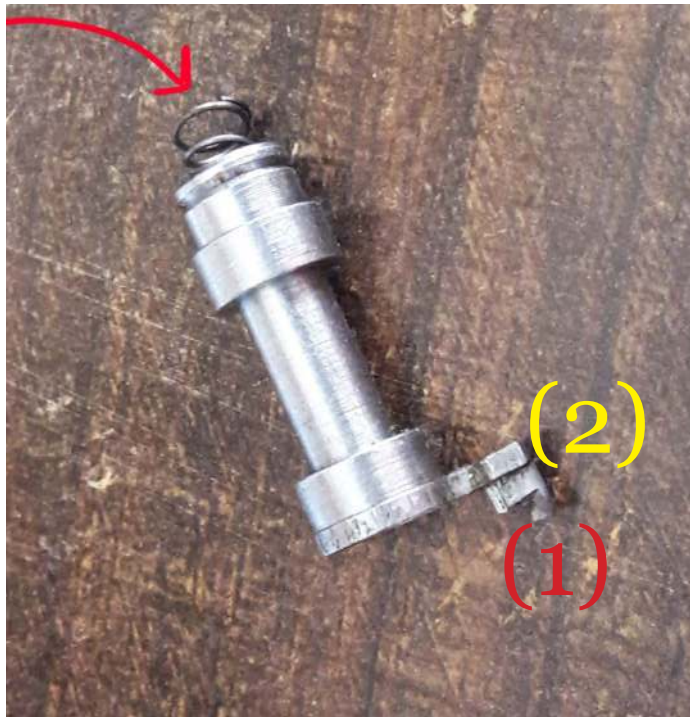
Removing the spring on the block will free the brake latch. Underneath the brake latch you'll find a spacer. This is very important in leveling the latch. Do not lose the it.

Shutter speed selector

Proceed by removing the screw on top of the speed selector.

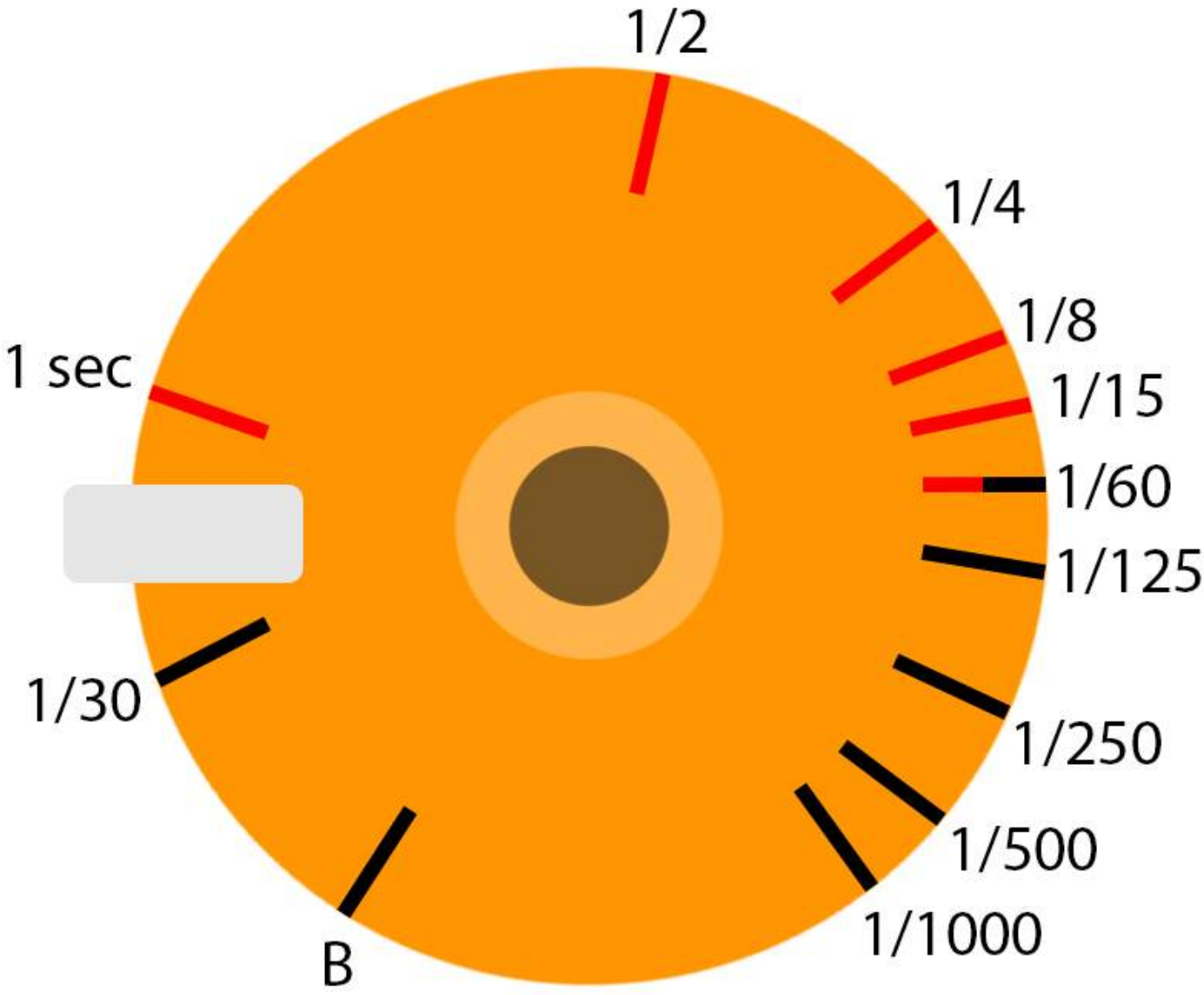


Under the screw you will find a spring. The spring inside assures that once the selector is lifted, it will fall back down and firmly stay in place on the shutter speed dial. A loose speed selector will cause malfunctions. The pin (1) on the speed selector sits in the grooves on the SS dial, which address each speed, and the cam (2) above it times the speeds and engages the slow speed escapement gear pin past 1/60. The faster shutter speeds are engraved deeper on the dial compared to the slower speeds. This is so that when the shutter is released the cam does not engage the slow speed escapement.



Shutter speed dial

The following illustration shows the orientation of speeds on the SS dial in the cocked position. The black section is considered to be the faster speeds and the red sections are considered to be the slower speeds (controlled by the slow speed escapement). As mentioned on page 12, 1/30 and 1/60 are considered slow speeds, but have no connection to the slow speed escapement. I've marked 1/60 both red and black for two reasons since it's a slow speed and because the escapement gear pin slightly shifts when 1/60 is selected. However, it still does not engage the slow speed escapement.



Shutter Speed Dial Orientation

The picture above shows the dial in the released position with the pawl facing the brake latch hole. If the shutter is cocked (9 o'clock position) removing the screw would impossible since it would be facing towards the rangefinder mechanism. Verify that the shutter is released before proceeding. The shutter speed dial will lift off once the screw is removed. A little bit of force my be required due to the tight fit. Keep in mind, it is removed and installed one way only.

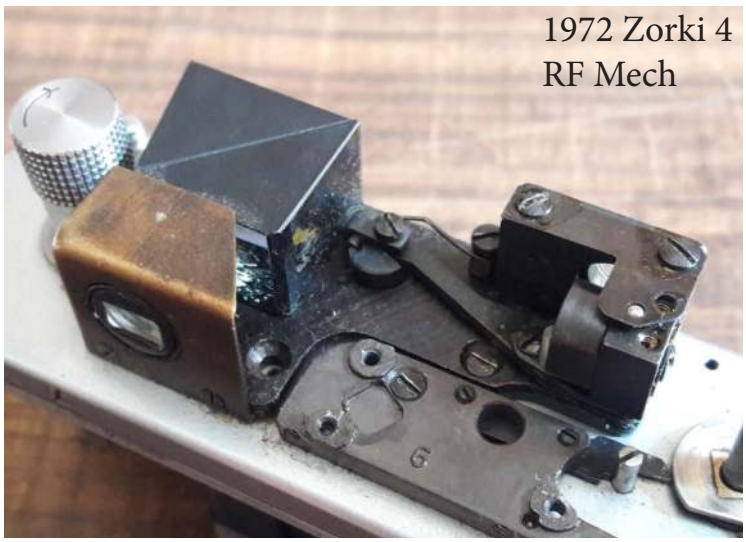
Correct

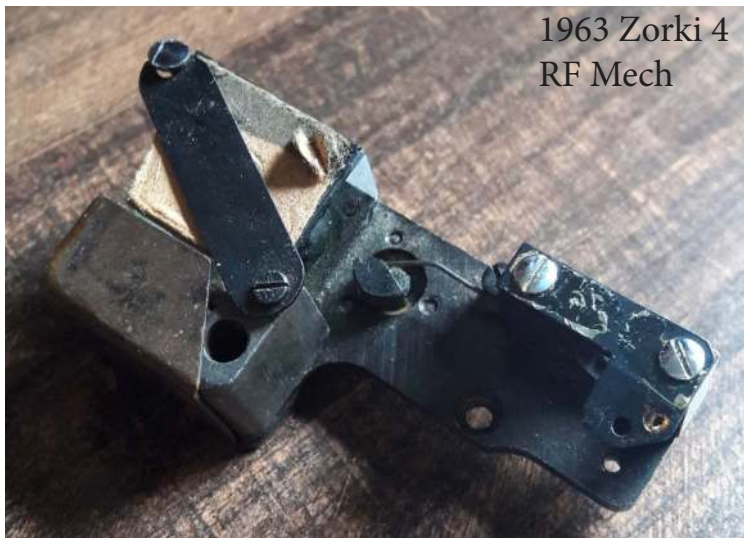
Incorrect

Rangefinder mechanism

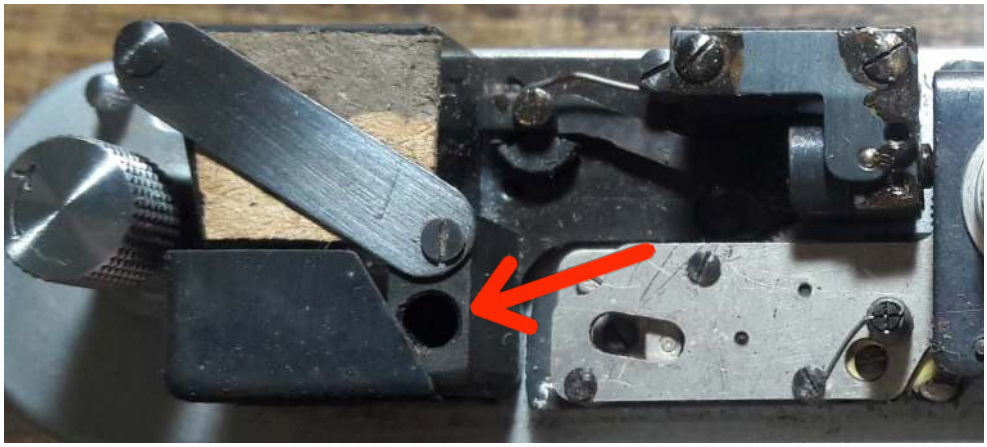
During the course of production, many changes were made to the camera parts. One of the few examples here are the rangefinder mechanisms. The system is surely the same, but appearance wise, a tad bit different. The rangefinder rotating window seems to have also been changed from a block to just a flat mirror. Also, the 1963 version seems to have some sort of paper seal on top of the beam splitter (for spacing maybe). It's being held down by a screw that's connected to a block and a pin, all of which have been scrapped later on during production. More differences are discussed on page 84.

RF ROTATING MIRROR

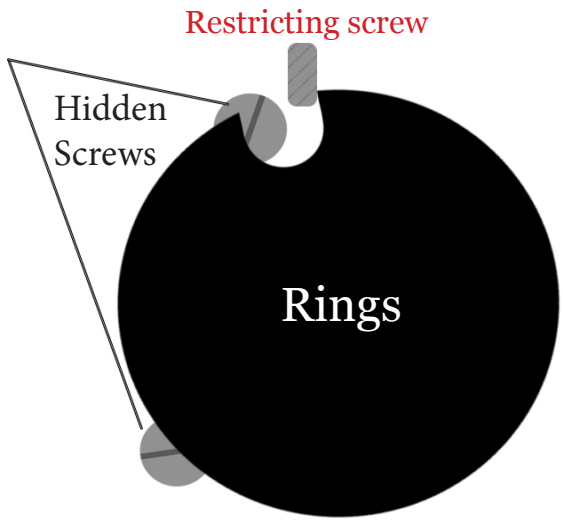


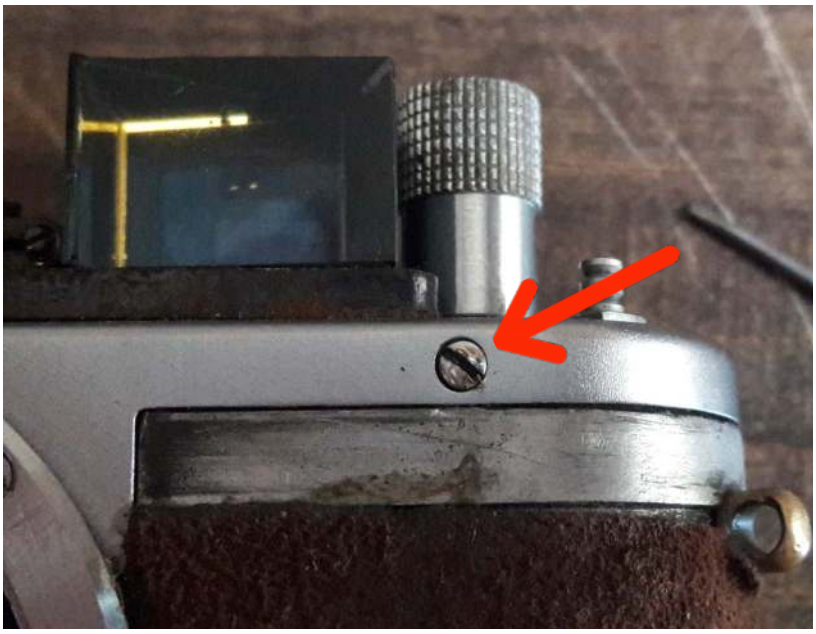


Removing the rangefinder mechanism from the body is fairly easy. It comes off as one block. There should be a total of only 4 screws. Two of them of which are hidden under the rewind knob shaft rings. The visible screws are near the diopter and RF rotating mirror arm. The older RF design has a block with a hole, measuring to a depth of 13.40mm, next to the diopter (see picture below). You'll need a screwdriver with a thicker handle for more torque to remove it. Once these are out go ahead and flip the camera over.



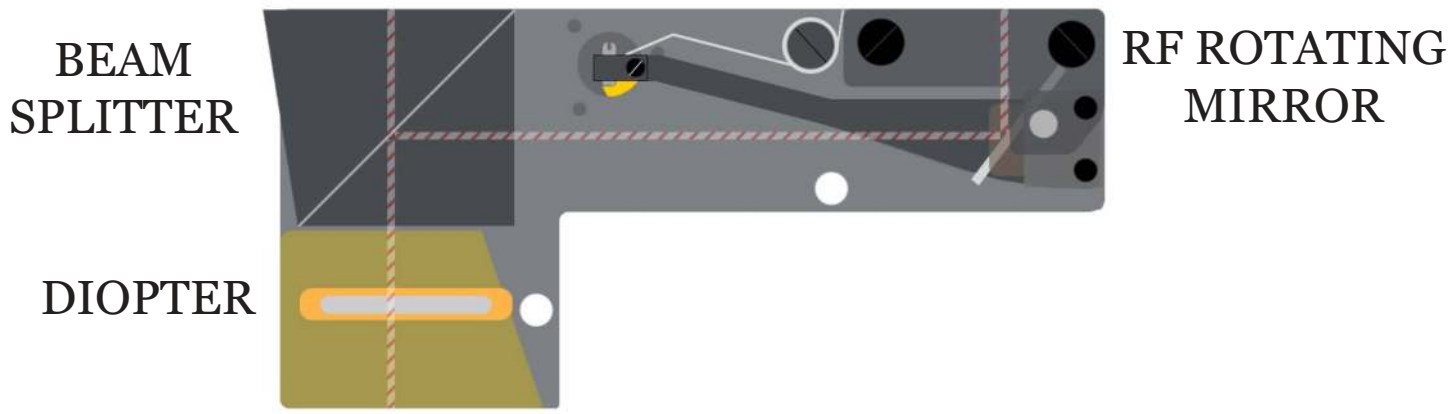
In order to entirely remove the rangefinder mechanism from the body, the rings must be shifted CCW and the screws under them must be removed. To shift the rings, the restricting screw must first be removed or slightly unscrewed. It can be found in the front of the camera below the viewfinder. The two screws under the rings are also tied to the shutter crate, but will not affect its stability if removed. The shutter crate is held down by four extra screws (top plate and shell).





Restricting screw

When all four screws are removed, gently tilt the block towards yourself and lift. Be gentle and refrain from applying pressure towards the side of the rotating mirror. The rotating mirror is only held down by two micro ball bearings and a cover. A loss of a ball bearing would mean paperweight, so be careful. Place the mechanism in a safe place. More information will be discussed later.

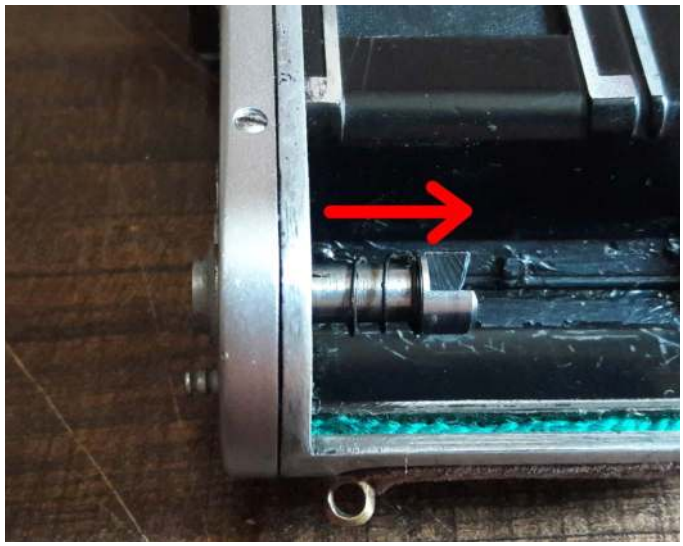


Pages 76-81 will discuss the calibration of the rangefinder mechanism.
Pages 84-91 will discuss the disassembly of the rangefinder mechanism.

Rewind Knob

One of the last things left before we start removing the shell is the rewind knob. This is quite easy as only one screw needs removing. The rest will just come off, including the diopter control arm.

Lift the knob and remove the screw around the ring.



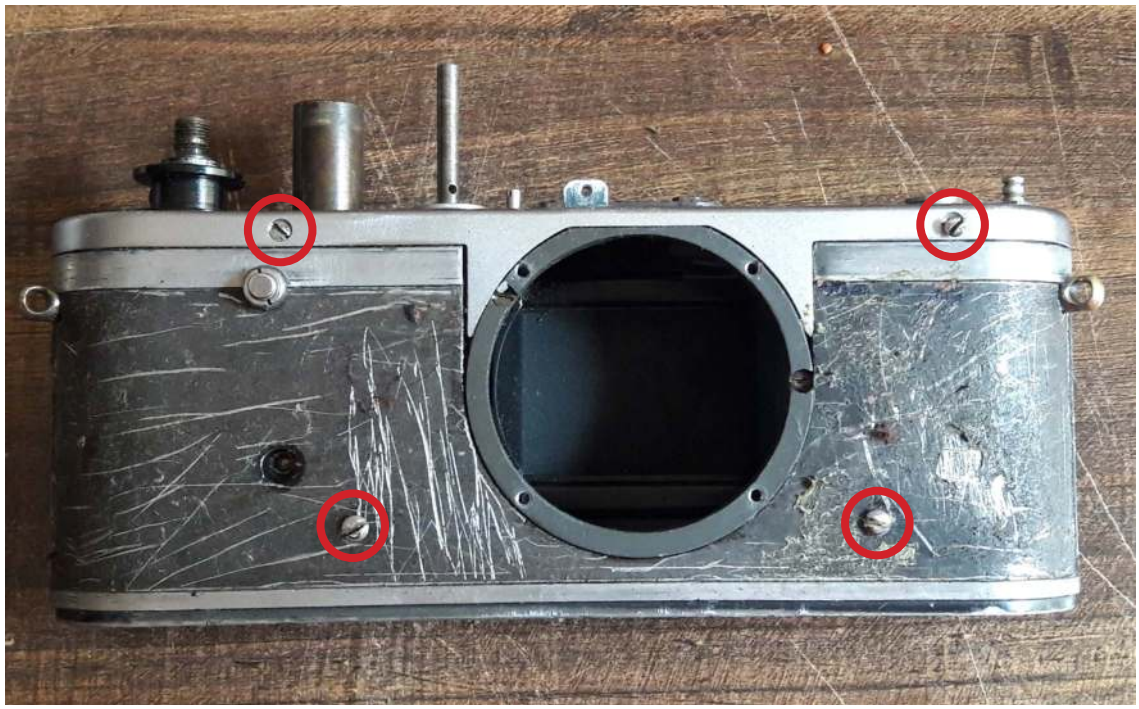
Pull off the ring and then remove the shaft with the spring from under the plate. The rings should also fall off at this point. Cleaning and adjusting maybe needed before reassembly. A poorly adjusted rewind knob will effect the winding operation of the camera. See page 54 for more information.

The lens mount

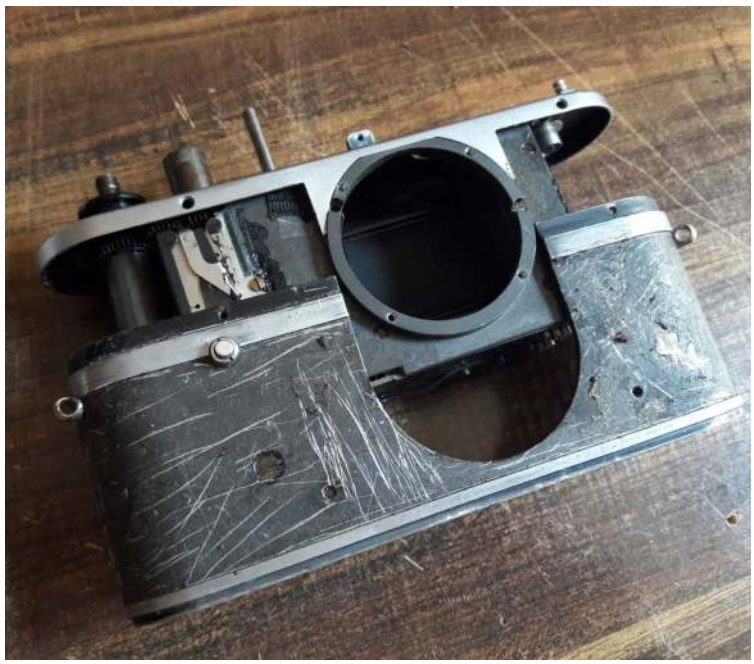
Simply loosen all 4 screws and lift the mount from the base. Below you'll find several brown paper shims. I want to make it clear that marking their previous locations will not guarantee the correct flange (distance from lens mount to film base). A flange distance calibration is always required during reassembly of the lens mount. Flange distance adjustment is discussed on page 73.

The shell

You can find a total of 7 screws around the camera, including the self timer arm, that keep the shell in place. The two below the mount are a little longer in length compared to the rest of the 5. All 7 must be removed in order to remove the shell.

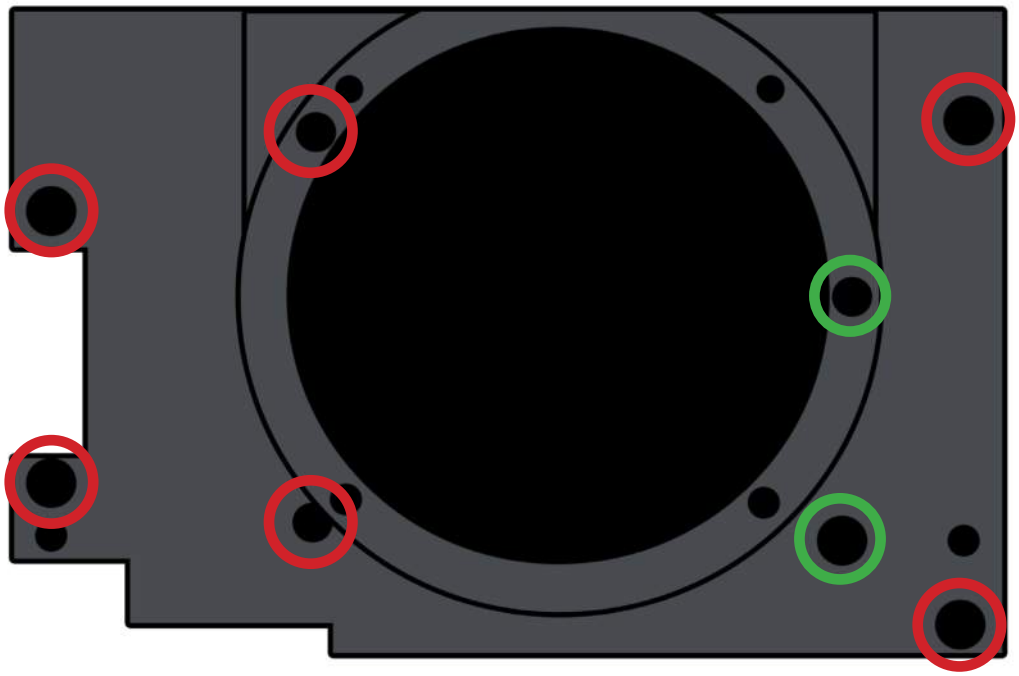


The self timer screw is generally RH threaded, but it may also be a LH thread, so be careful while removing it. Too much torque will break the screw, especially if corrosion is present.

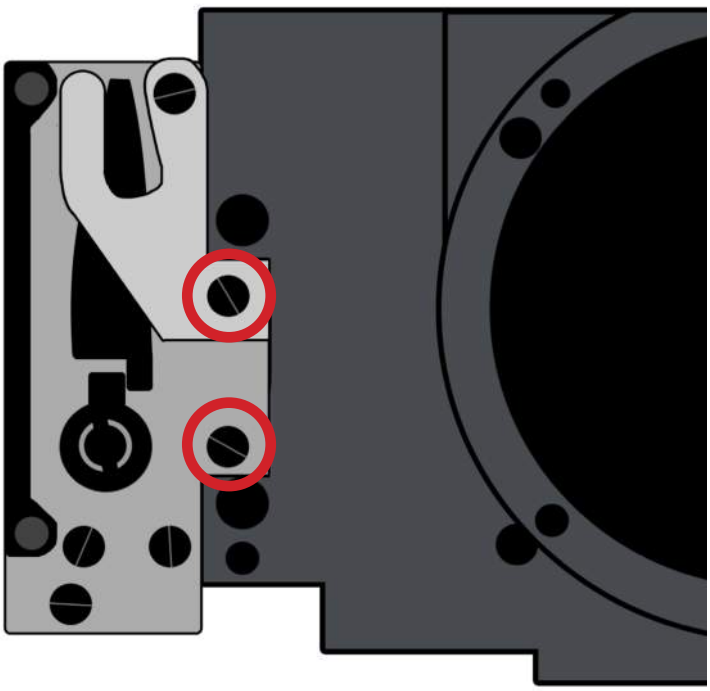


Lens mount base

The lens mount base has a total of 8 screws. Two of them of which only belong to the roller light baffle. In any case a long screw (circled in red) was inserted into the roller light baffle thread (circled in green), the shutter would jam. It is important that the two shorter screws go in the right place (green). The rest simply do not matter.



Lens Mount Base
Green: Short - Red: Long



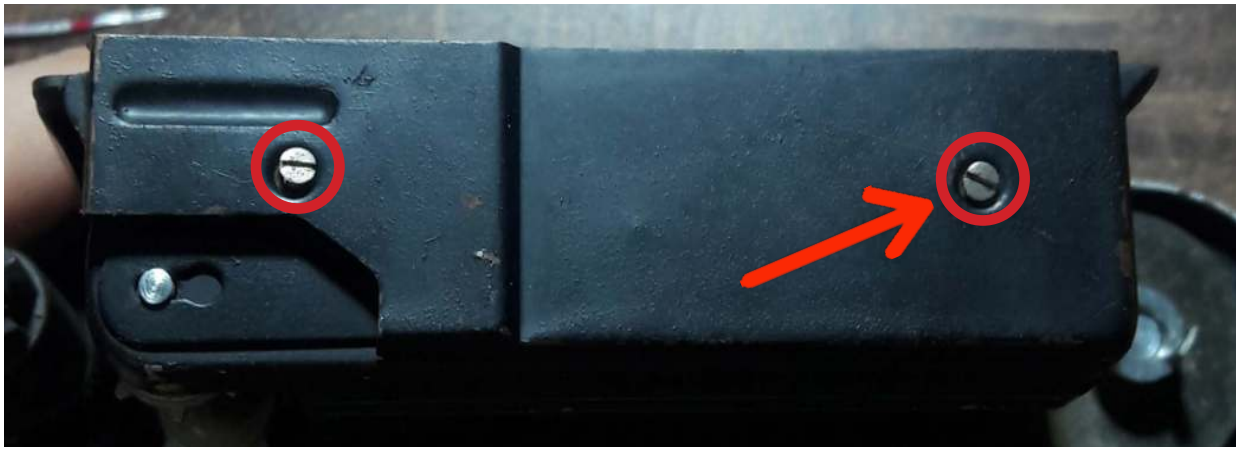
Self timer mechanism

The self timer mechanism can be removed at anytime. Before or after the lens mount base. It is held down by two screws (circled in red).

Pages 61-20 will cover the disassembly of the self timer.

Shutter baffles

The light baffles prevent light from reflecting and entering the film plane. The Zorki 4 has a total of 3 light baffles: Drum, center, and rollers. The roller baffle (right side) will require the removal of a screw located on the bottom side of the camera.

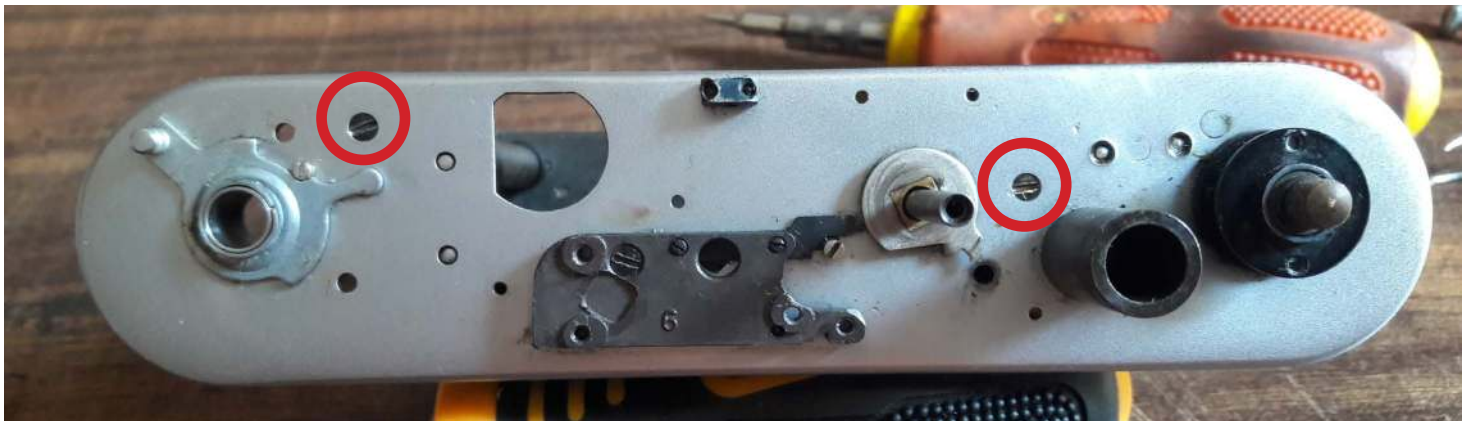


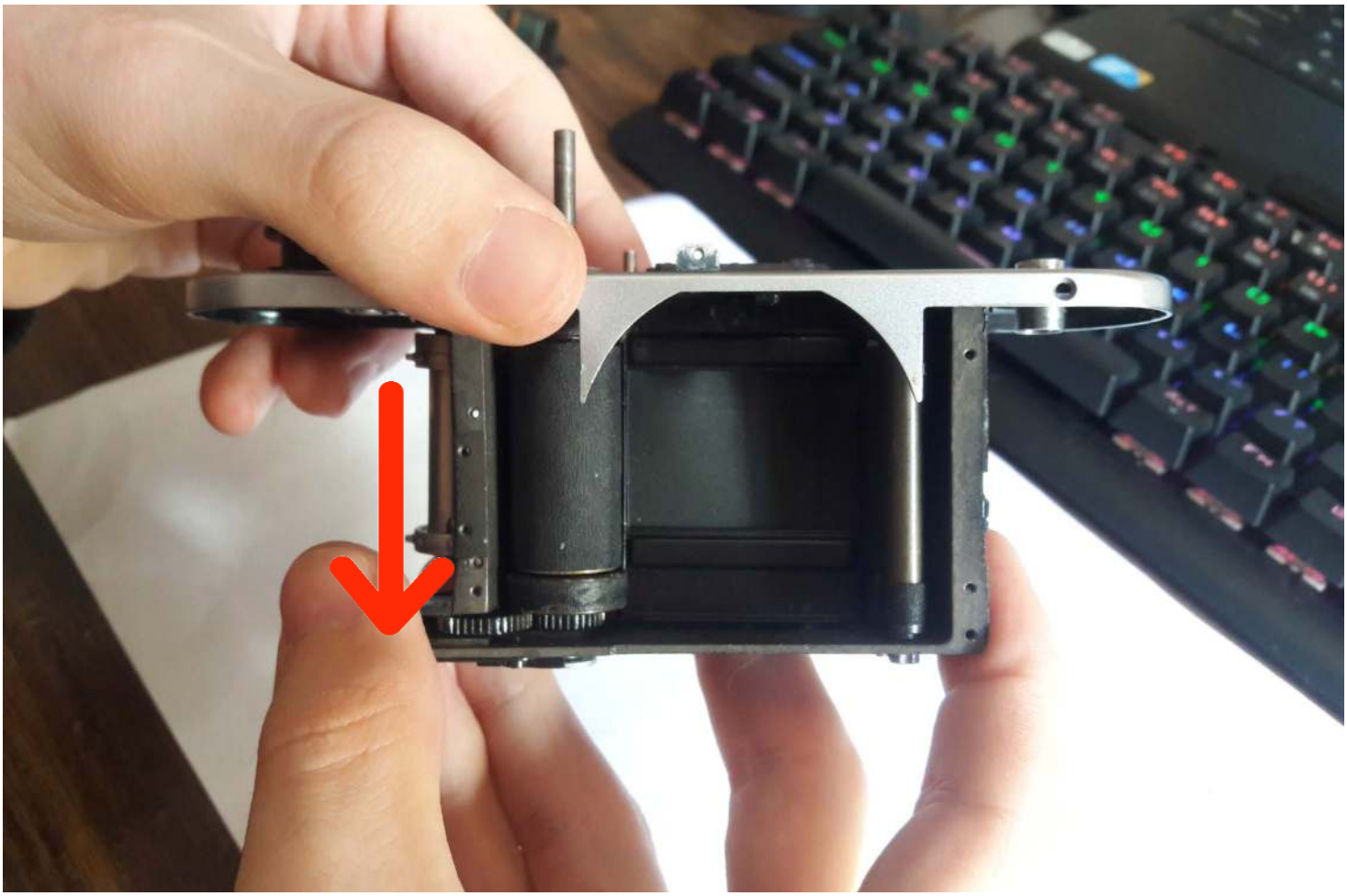
Shutter release spring

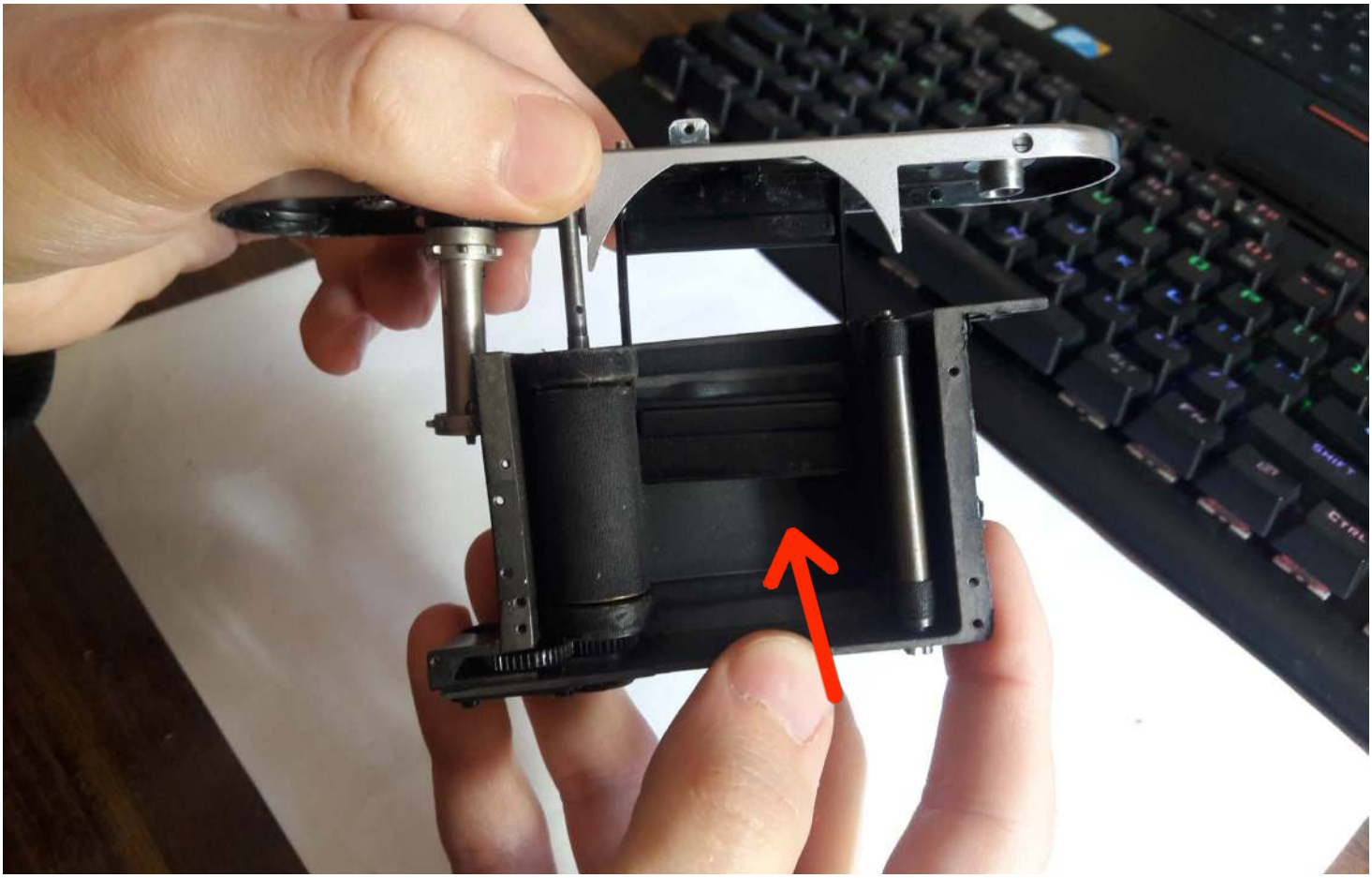
Remove the shutter release spring. This spring is held down by two screws and bolt, which also hold the bottom side of the center light baffle.

Removing the shutter crate

Before the shutter crate can be removed, we need to determine the original position of the drum and curtains. Take note of the pawl / coupling pin resting position (released). This is important for reassembly. If the pawl / coupling pin is not stationed correctly, the shutter curtains will not be properly aligned. The last two screws holding the crate can be found on top of the plate near the diopter control arm and pawl. Hold one hand on the top plate, the other on the shutter crate with your thumb on the drum, and gently pull away.







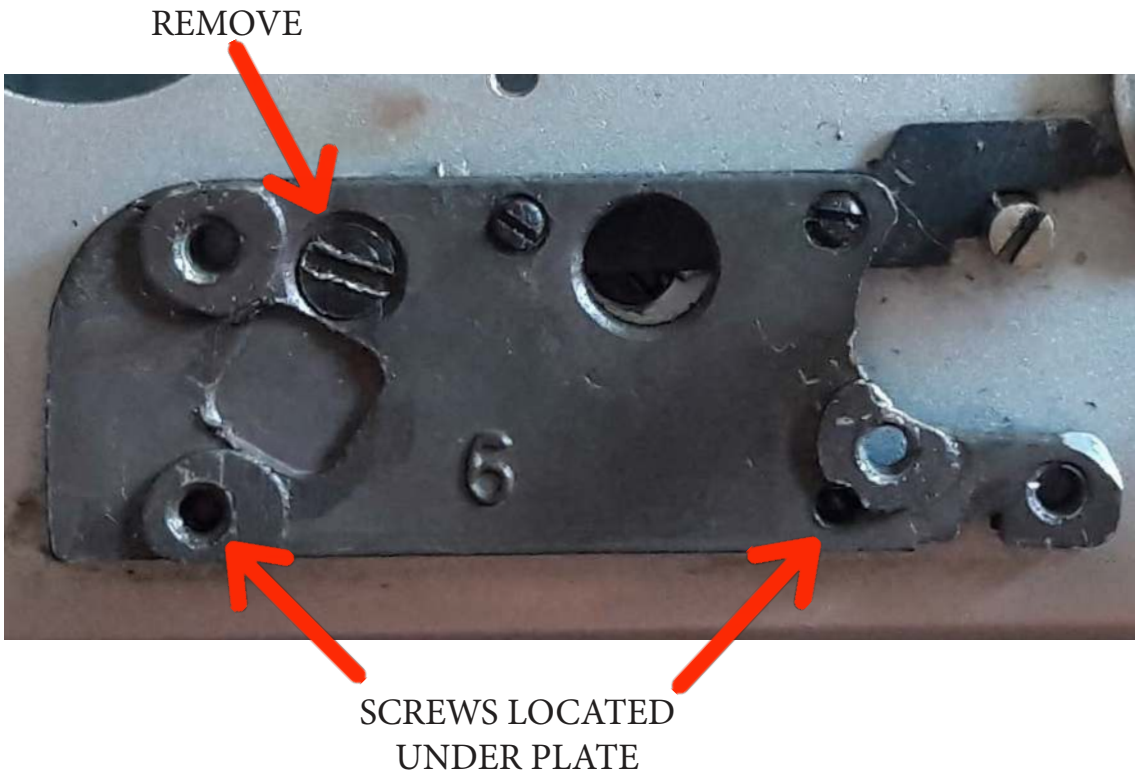
Be careful with the light baffle. It may catch on the ribbons.

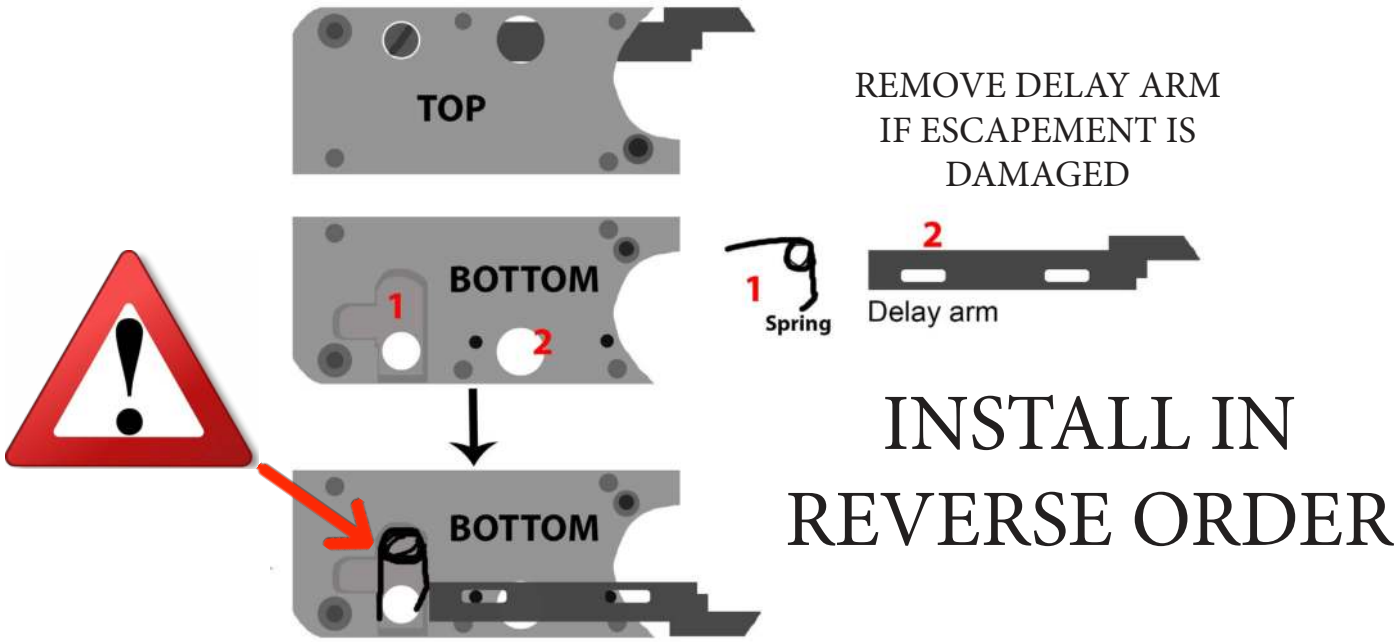
After the separation, the shutter release and cocking gear will fall out. This piece operates the shutter gear-set and goes back into the main transport wheel. It won't stay in place without the shutter crate, so set it aside for now.

Block and delay arm disassembly

The block and delay arm should only be removed if the delay arm needs adjusting or the escapement has been damaged. There should be no other reason for its removal. You may run the risk of losing the tiny spring underneath the block that helps the delay arm retract. Without this spring, the slow speeds will not work even with the escapement mechanism installed.

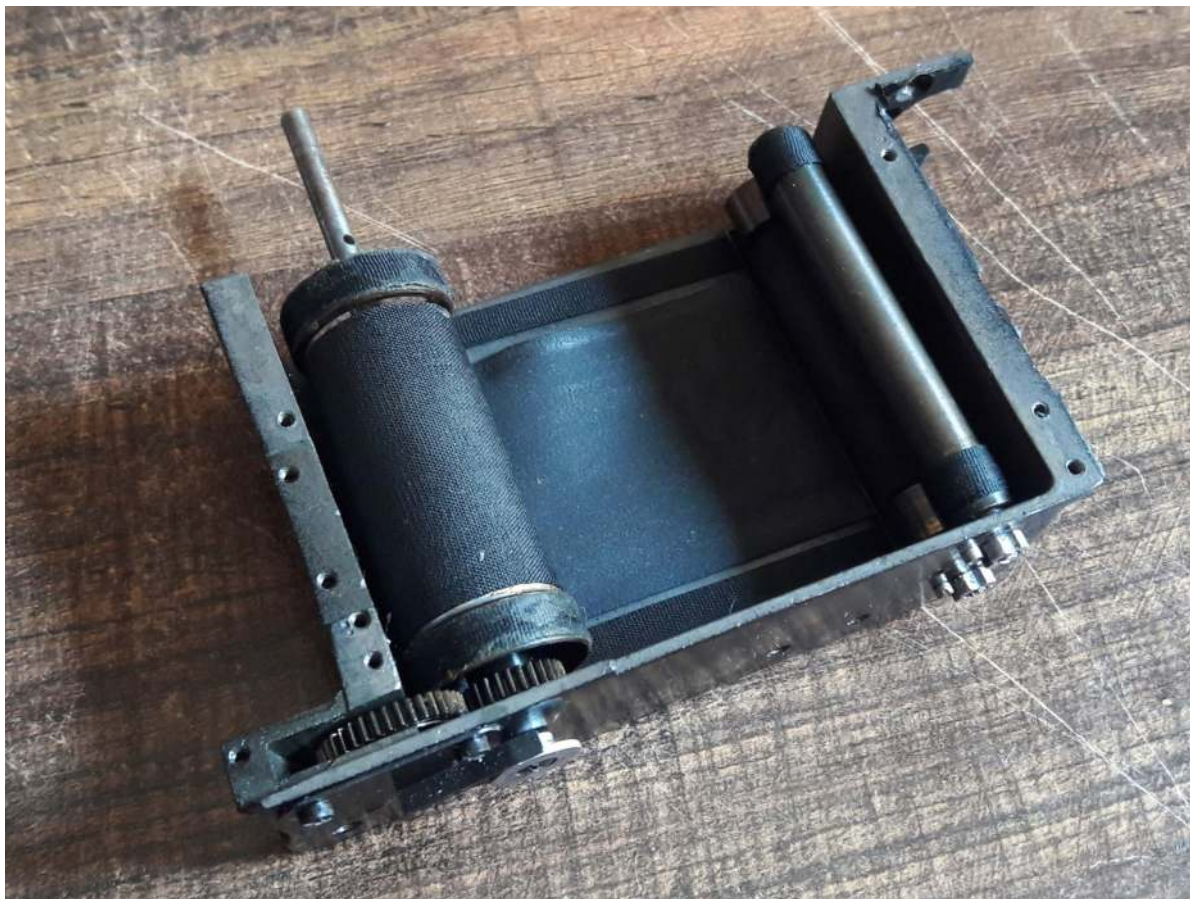
There are a total of three screws that hold down the block to the plate. The screw on top of the block holds the top portion of the center light baffle in place. The other light baffle screw is under the block and delay arm. The two screws holding the block are under the plate. When removing, do not immediately lift the block. Use your other hand to cover the bottom first.





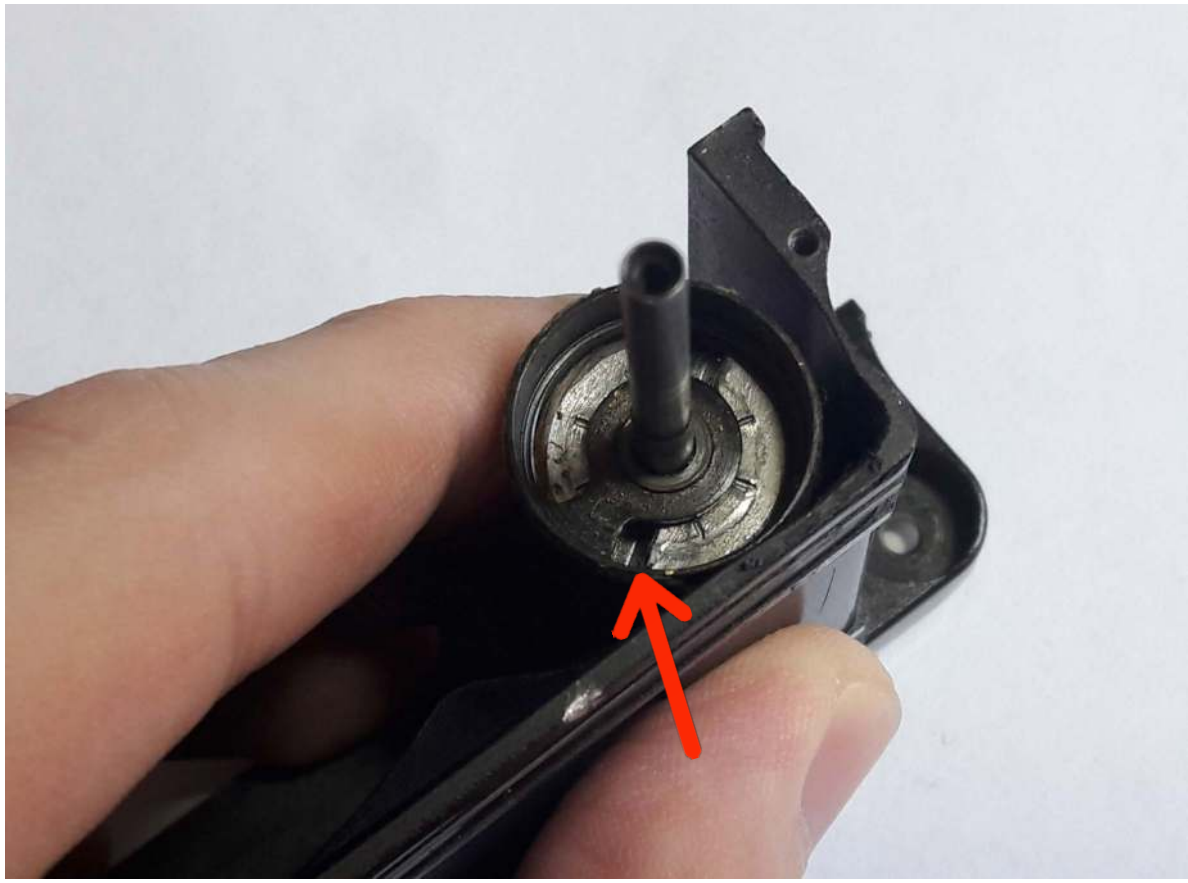
Shutter

At this point, you should have the crate completely separated from the top plate. Take a moment or two to examine it, but don't remove anything yet. There should be a drum, spring loaded rollers, curtains, and ribbons visible.

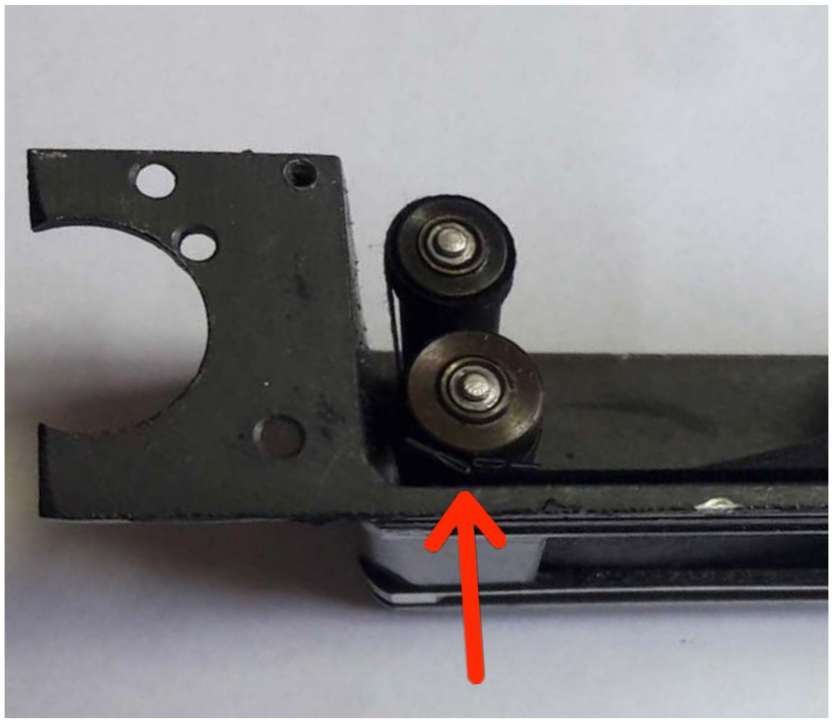


Removing the shutter curtains

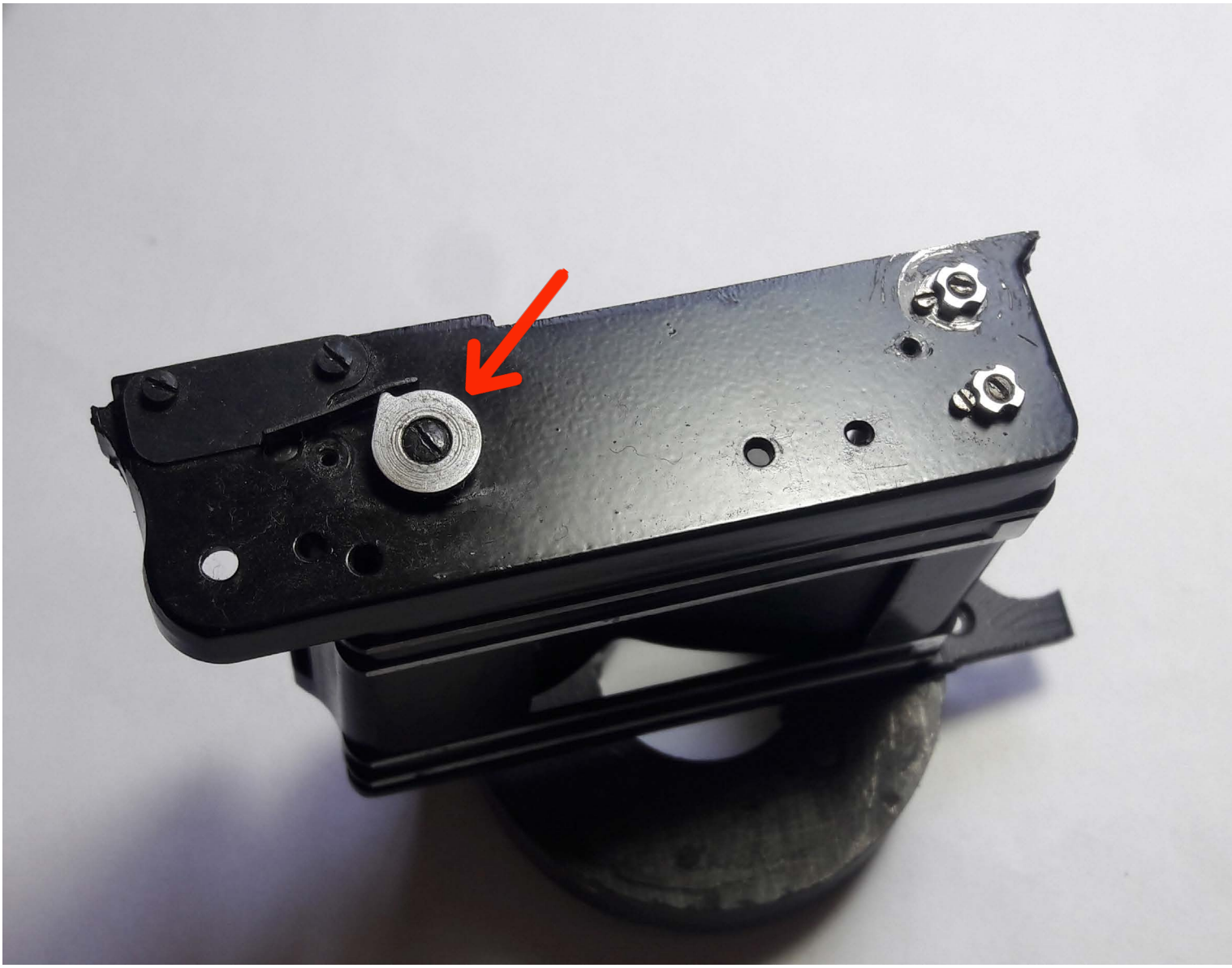
Before you start removing anything else, note the position of the coupling pin hole on the drum and the curtain laths near the spring loaded rollers. These are necessary for proper shutter operation. However, keep in mind that the coupling pin position may change for every Zorki or Fed camera (if you're following along with a different Zorki or Fed), so it's best to follow your own settings.



Coupling Pin Hole



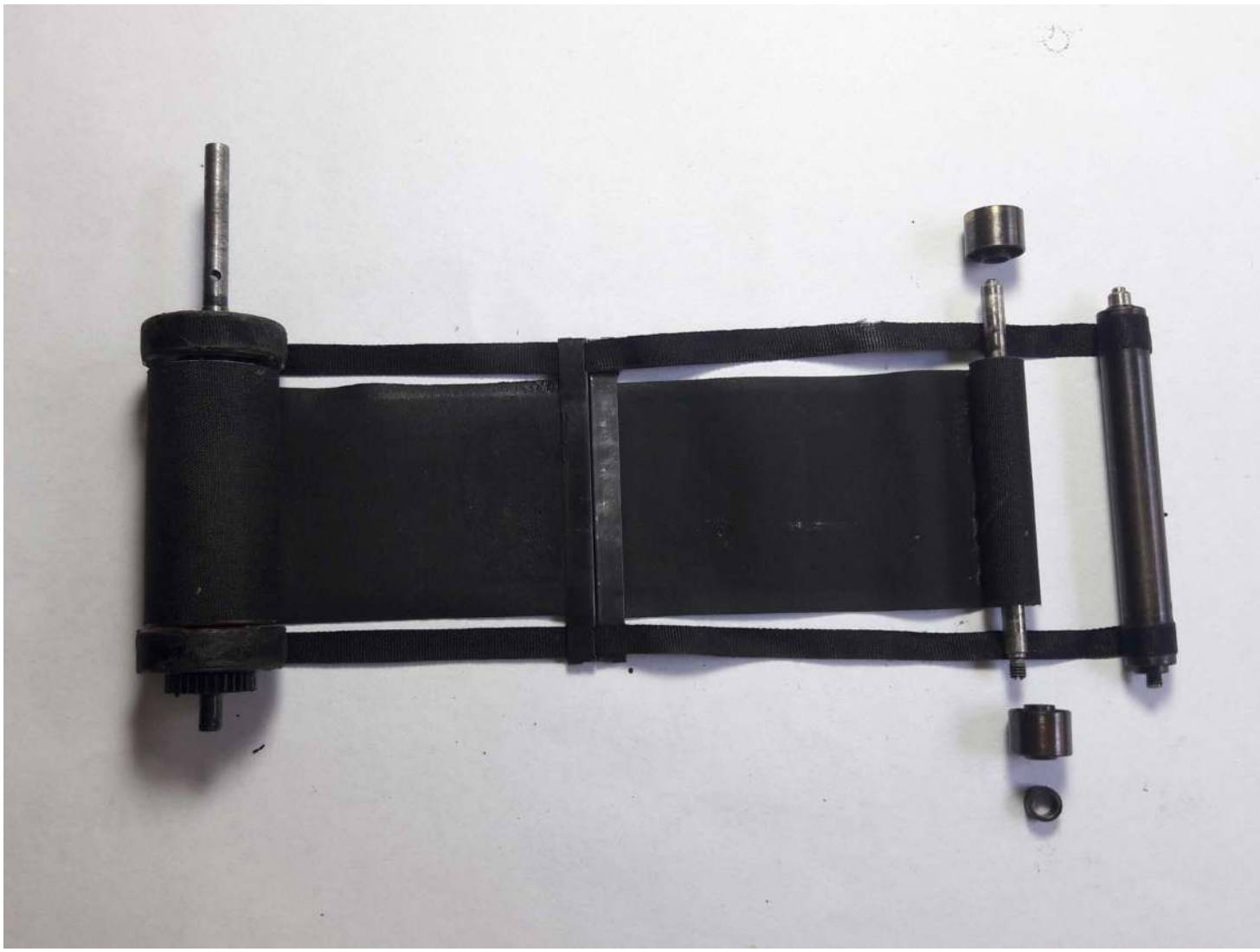
Curtain Laths

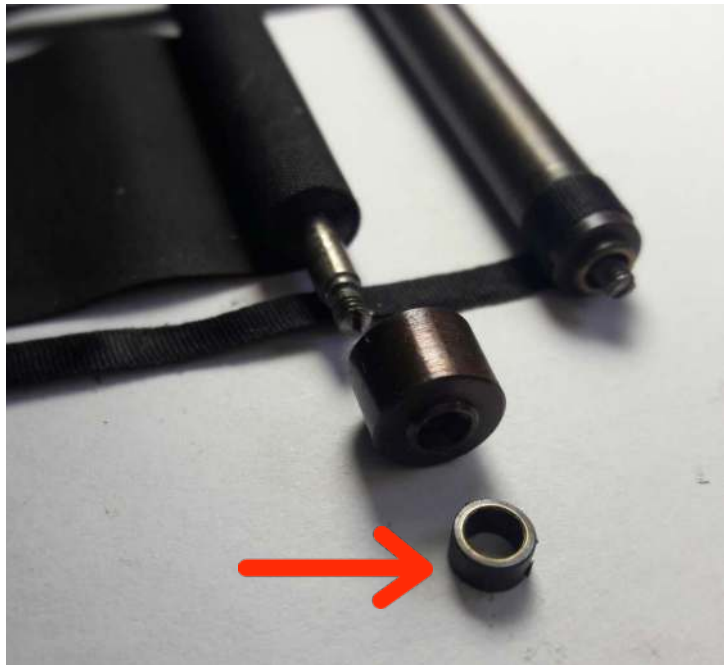


Next, the locking screws and lock nuts need to come off. This part is a little tricky because of how inverted it can be. Most people use pliers, but I find it easier to use my finger while removing the locking nuts. Pliers are usually necessary when the aligning the lock nuts with the locking screws

Here's how it's done: with a flathead screwdriver, turn the spring loaded roller (center screw) CCW about 2 turns and with your other hand, use your finger to turn the locking nut CW. You can use pliers if you don't feel comfortable using your fingers.

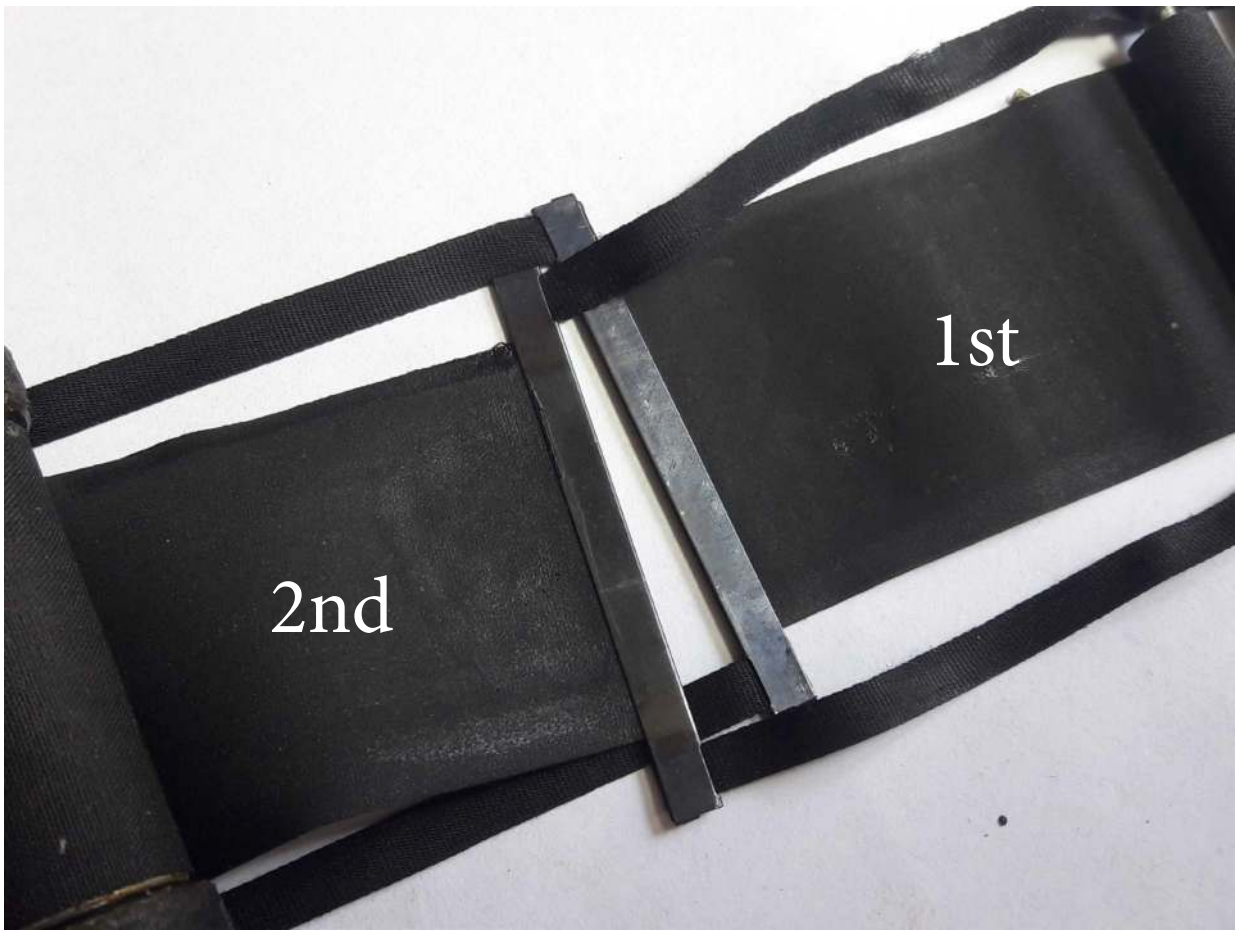
As the curtains slip out, two short tubes and a tiny spacer will fall out of one of the spring loaded rollers (opening curtain). The tiny spacer is very important for keeping this spring loaded roller correctly elevated. The two tubes also aid in the operation of the shutter, helping the ribbons travel with ease.

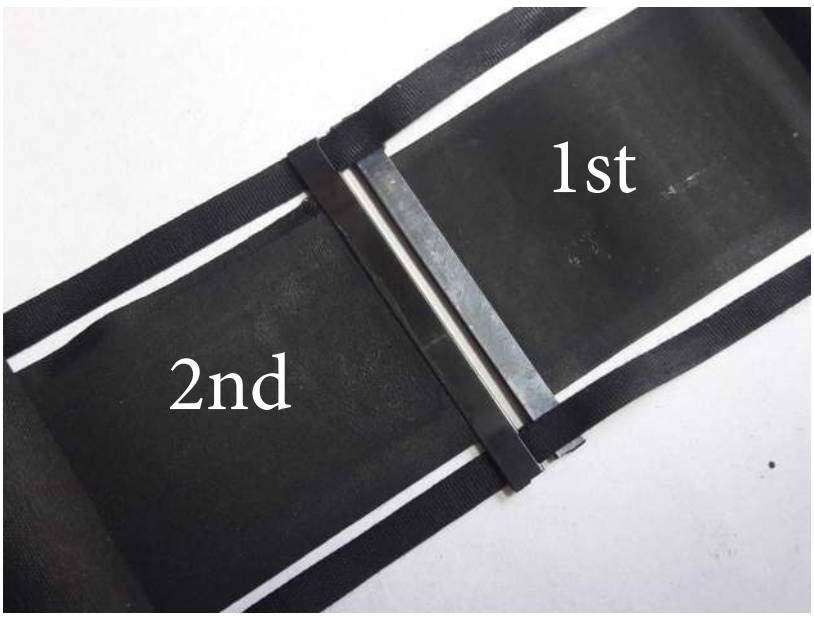




Curtain orientation

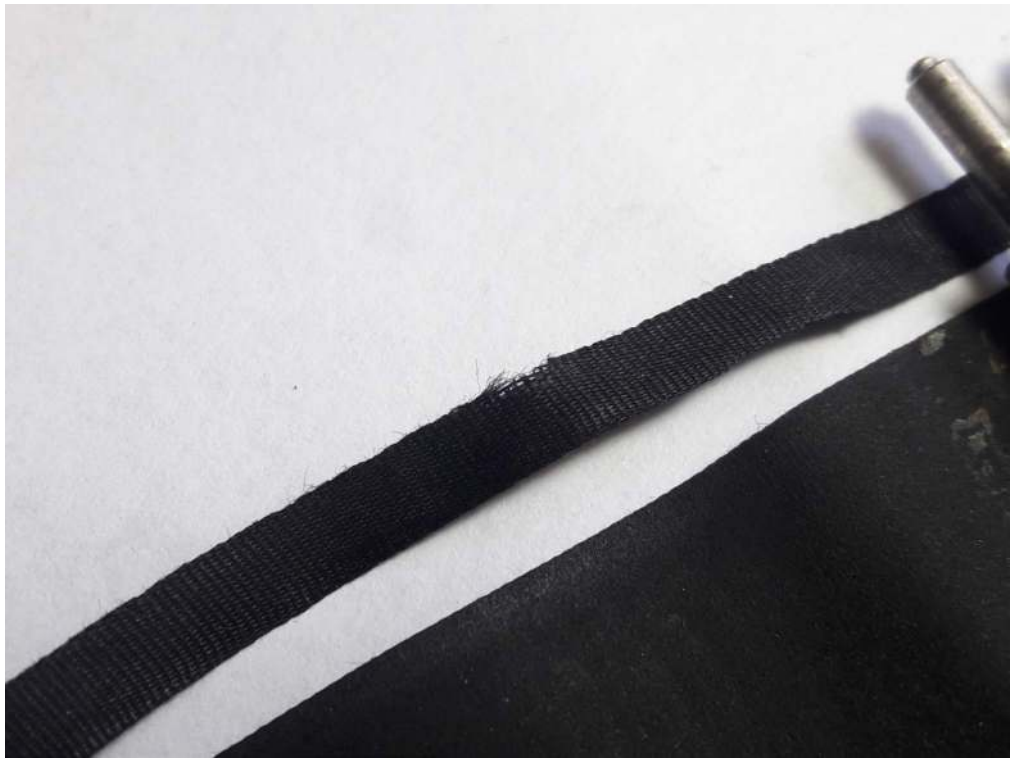
The second curtain goes over the first curtain lath. Then the ribbons of the second curtain go under the first curtain spring roller (the shorter spring roller). This is where the first curtain is attached to. To get a closer example, I attached two images below. The first one with the curtains and laths slightly shifted away from each other. The second example is what the curtains and laths should look like during assembly, as well as the ribbons. The drum and rollers MUST be inserted into the crate in this orientation.



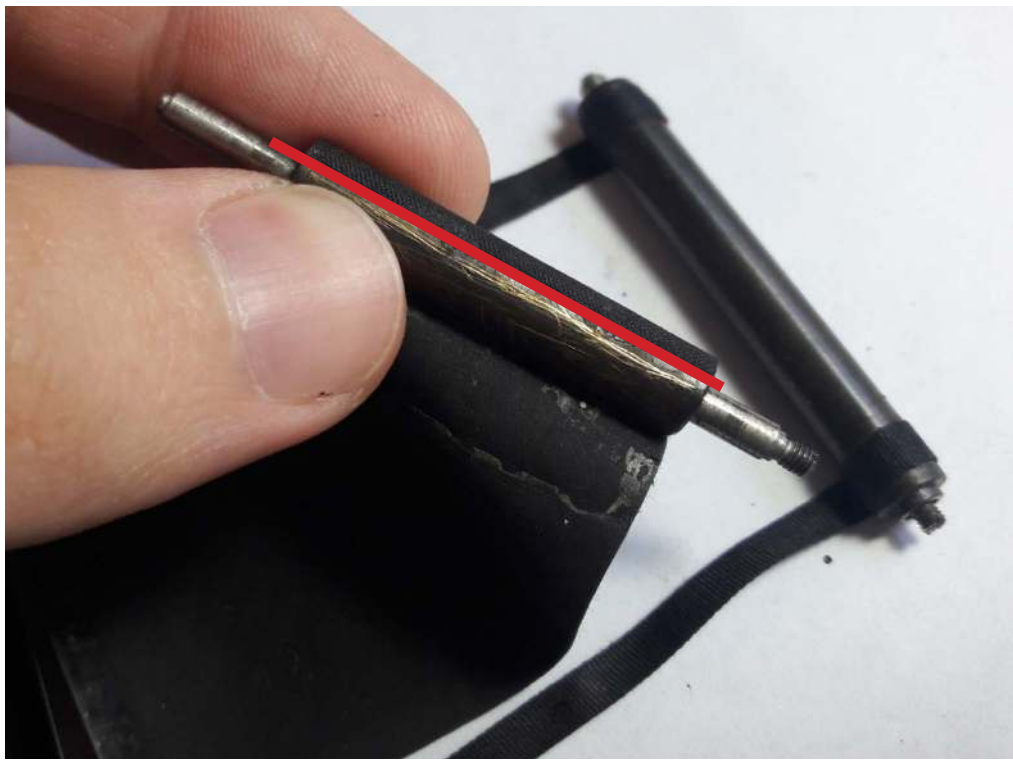


Replacing curtains and ribbons

Original shutter curtains will deteriorate due to age. The shutter is made from vulcanized cloth, which is very prone to damage over time, and needs replacing. Ribbons may also tear from friction or age. Dried lubricants in the spring rollers will also slow down the travel time of the shutter or even prevent the camera from working properly. However, with the right materials and measurements, the shutter can be completely restored.

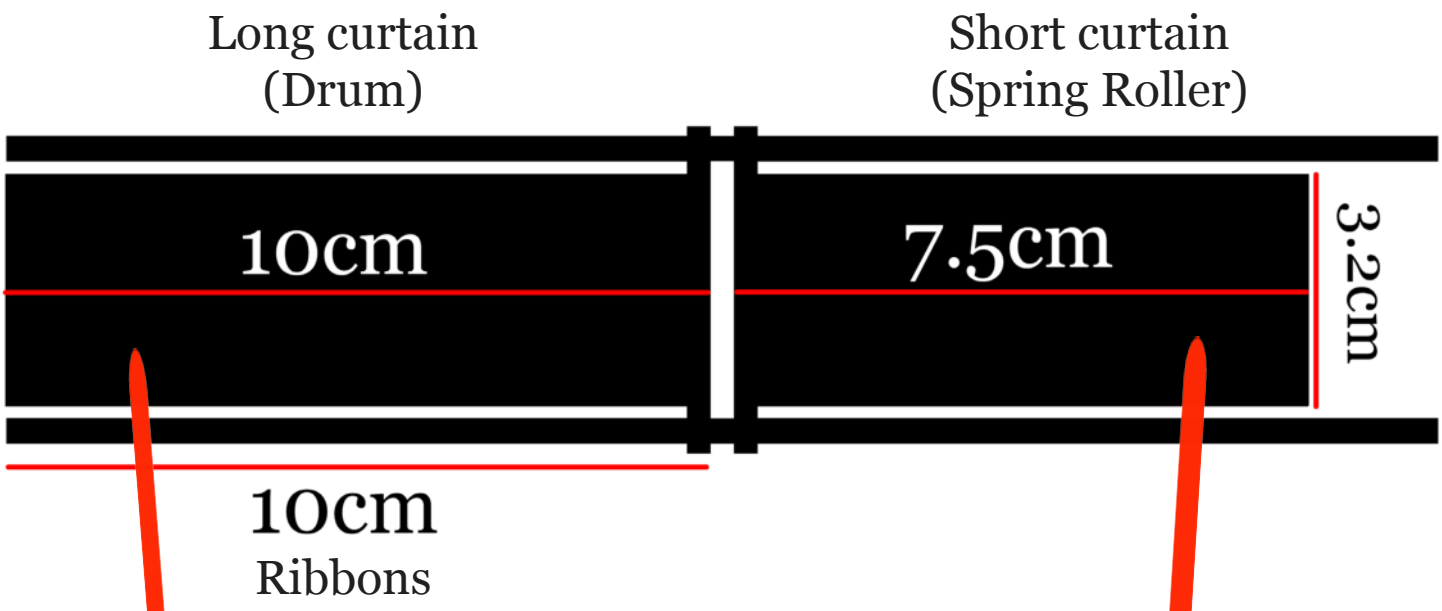


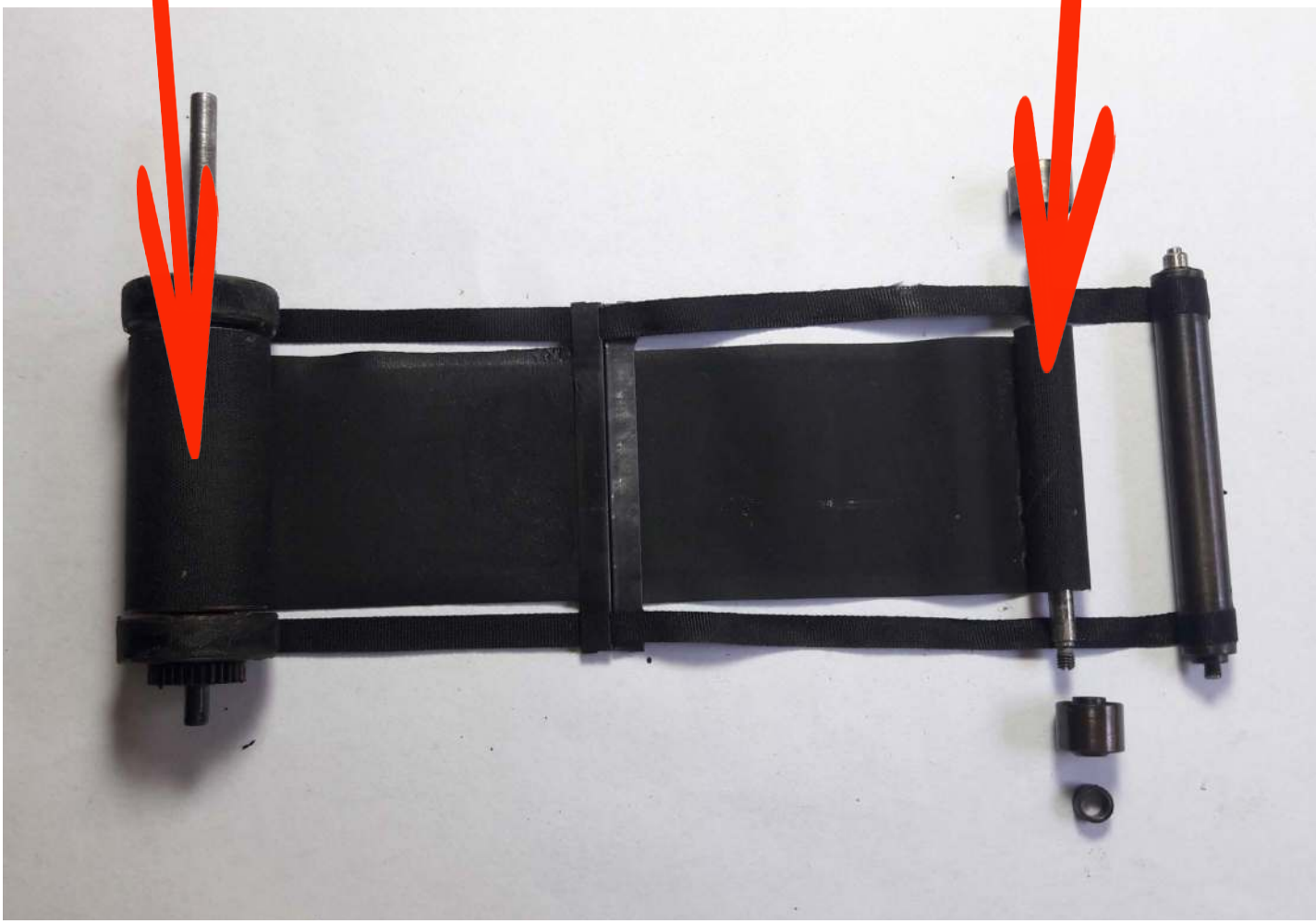
Damaged ribbon



Before removing the curtains and ribbons, always mark their edges. Not doing so will upset the shutter alignment. After removing the original curtains, measure their dimensions and use them when cutting a new ones. If the old curtains can not be measured, use the next page.

Shutter curtain and ribbon dimensions





Mark, remove curtains, measure, cut new curtains, and then glue. Simple as that. For gluing, I like to use contact adhesive. Contact adhesive is extremely strong once dry and easy to remove when necessary. Isopropyl alcohol or acetone can be used for removal. There are of course other adhesive alternatives, but contact adhesive has always worked best for me.

Cleaning and lubricating spring rollers

Accessing the spring inside the roller requires removal of the curtains. Though, depending on the condition of the curtains (hoping they're not brittle), unscrewing the cap off with the curtain still intact is possible. If your aim is to just clean and lubricate the rollers, then just gently peel only the upper part of the curtain where the cap is located and unscrew. Use of pliers may be necessary.

Soaking the springs in naphtha, or your preferred cleaning fluid, would flush out all the dirt and dried lubricants. Do not flush the spring through the opening of the roller and reassemble without lubrication. This will only cause damage. Use a Q-tip and clean the interior of the roller. Dirt and dried lubricants can found here as well.

Cleaning and lubricating the drum

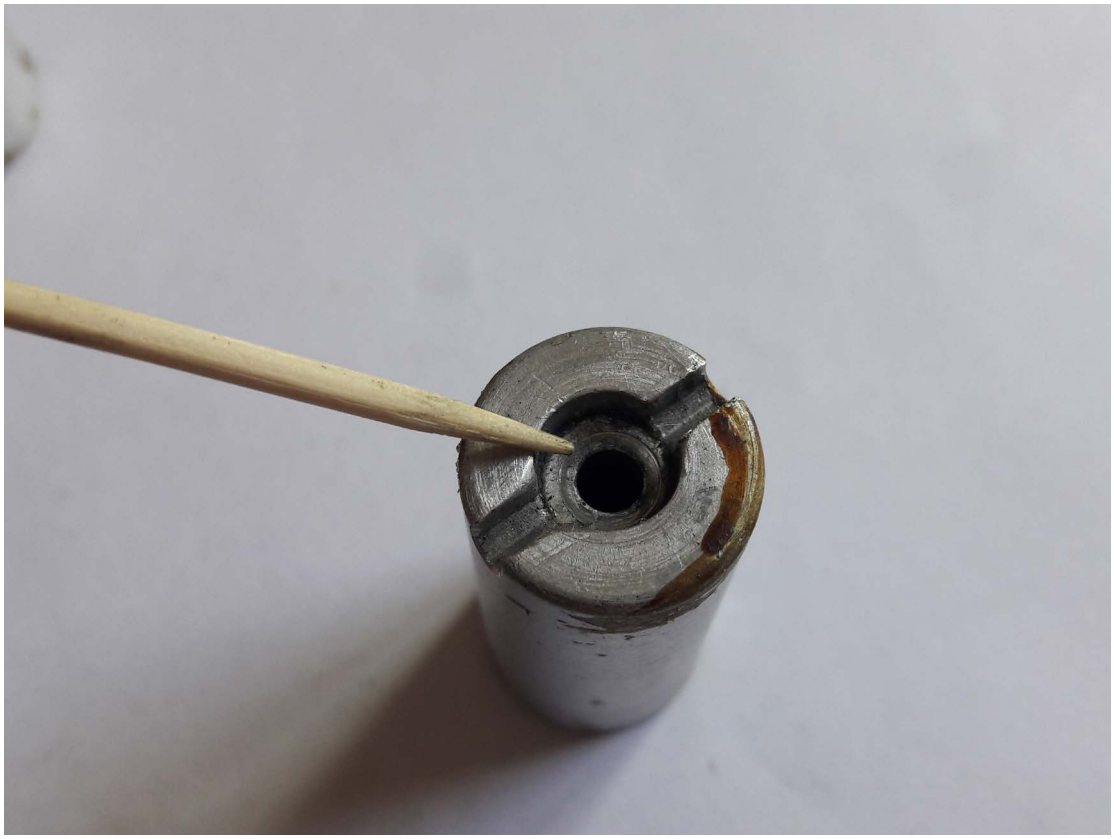
There are two versions of the drum. One is held down by two screws (top and bottom) and the other is held in place by a just one pin. The pin is easy to remove, but quite difficult to put back in. If you cant seem to insert the pin back in, an appropriate sized screw can be substituted in place.

Pin version
(From 1972 Zorki 4)

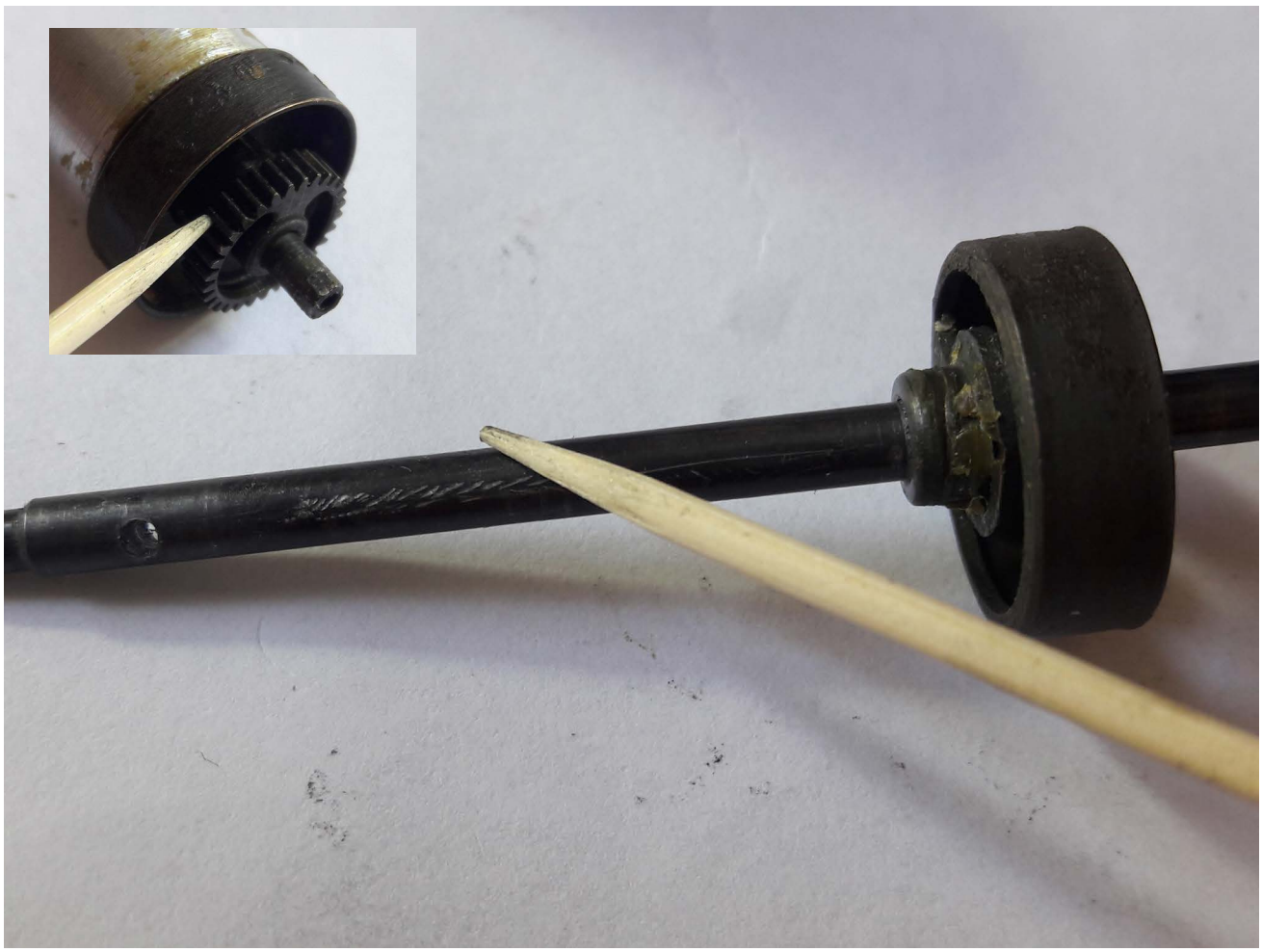
Screw version
(From 1963 Zorki 4)

Only the screw or pin on the bottom gear of the drum should be removed. The rest will just slip right off. Here you can see the drum disassembled.

Clean drum vs dirty drum



Thoroughly clean the exterior, interior, and around the groove. Finally, lubricate the spindle and grove of the drum with watch oil. Only lubricate the bottom gear when the shutter is installed back in the crate. Work the drum a few times by spinning it and reassemble when finished.

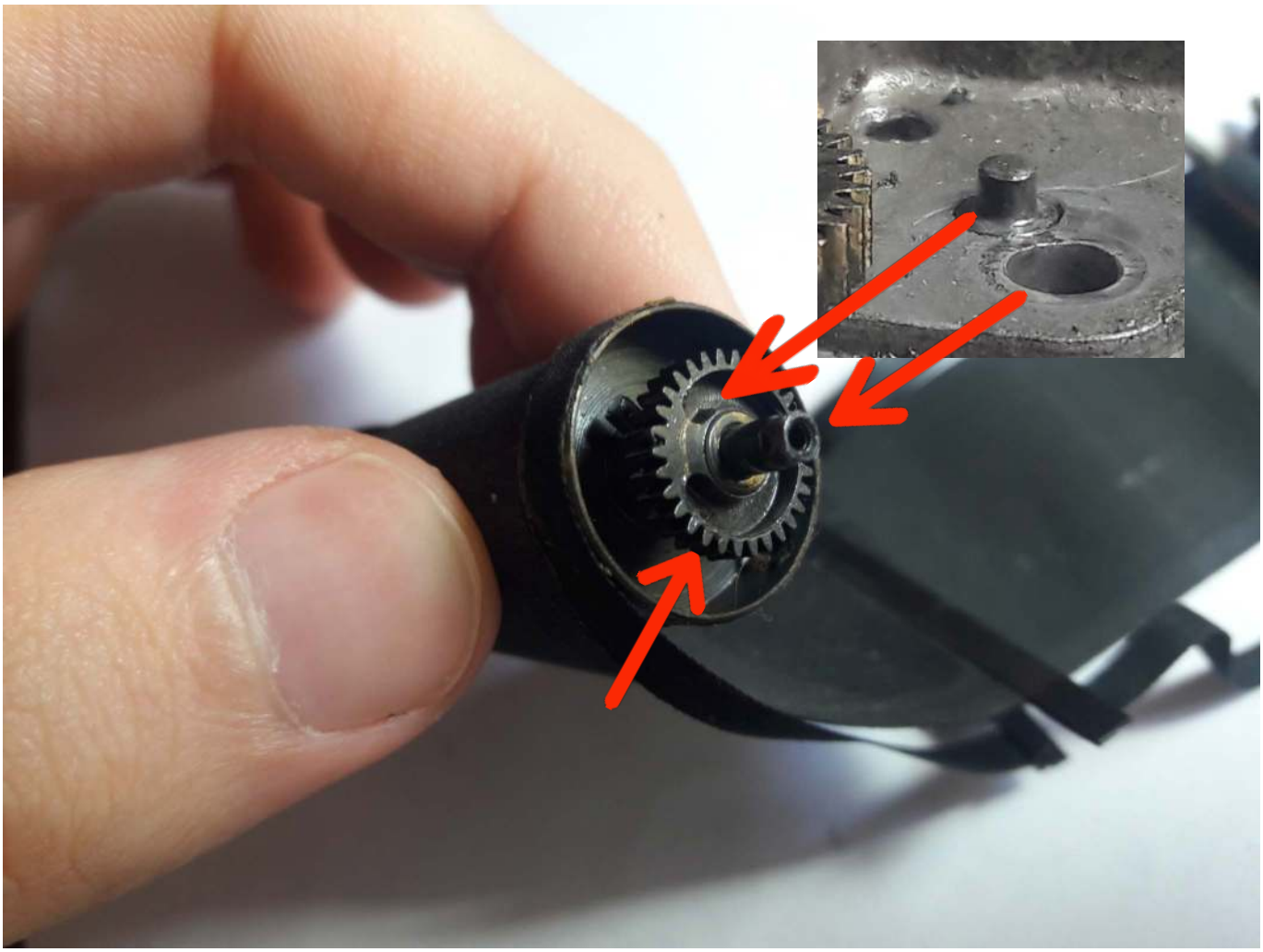


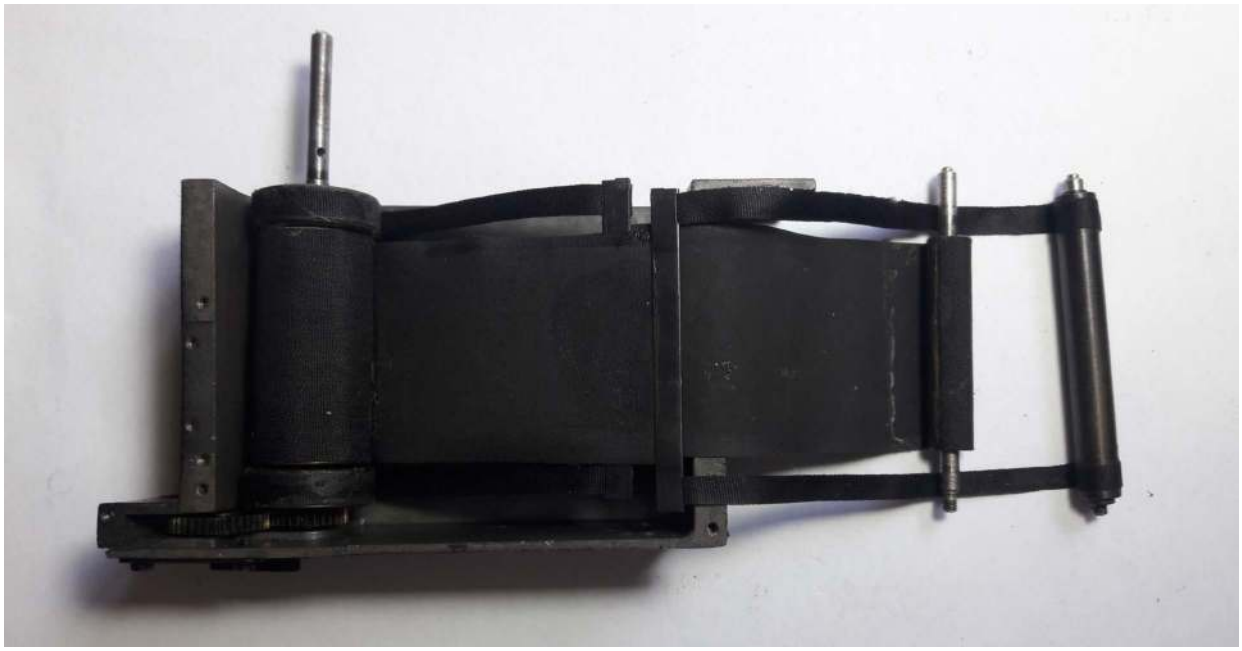
Shutter crate

You'll most likely find lots of film chips and who knows what in here. A rough cleaning is highly recommended. With watch oil, lightly lubricate the top and bottom shafts of the gear, located near the breaking spring and where the self timer would be stationed.

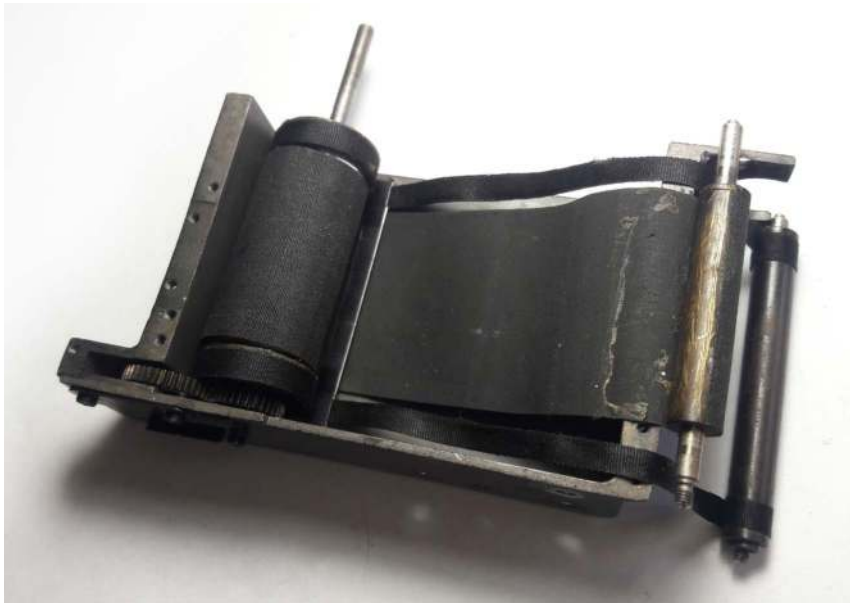
Shutter reassembly

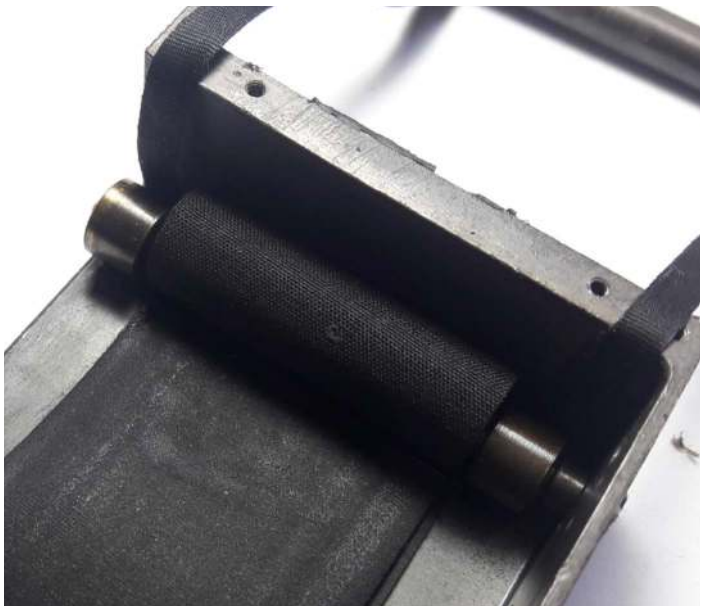
Double check the curtain orientation before continuing. Remember, it is very important for assembly and proper shutter operation. Once everything is in order, lay the shutter crate down. Insert the drum into the hub, with the pin seated in the groove of the bottom gear.

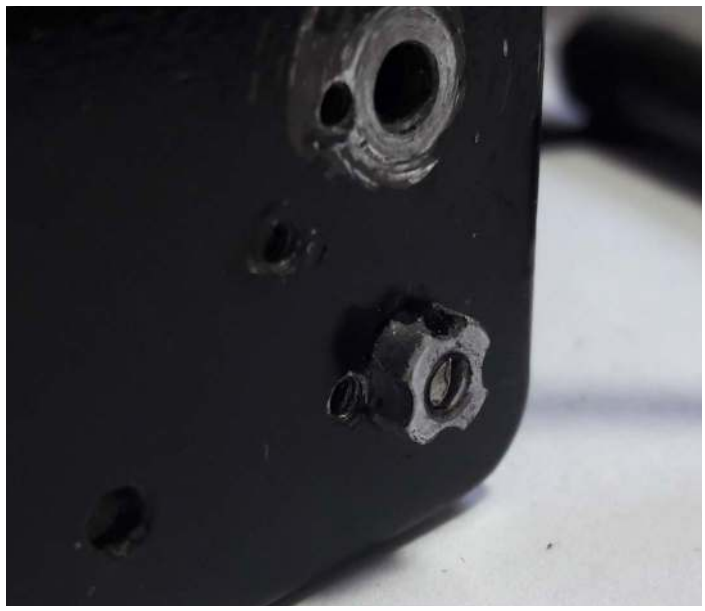




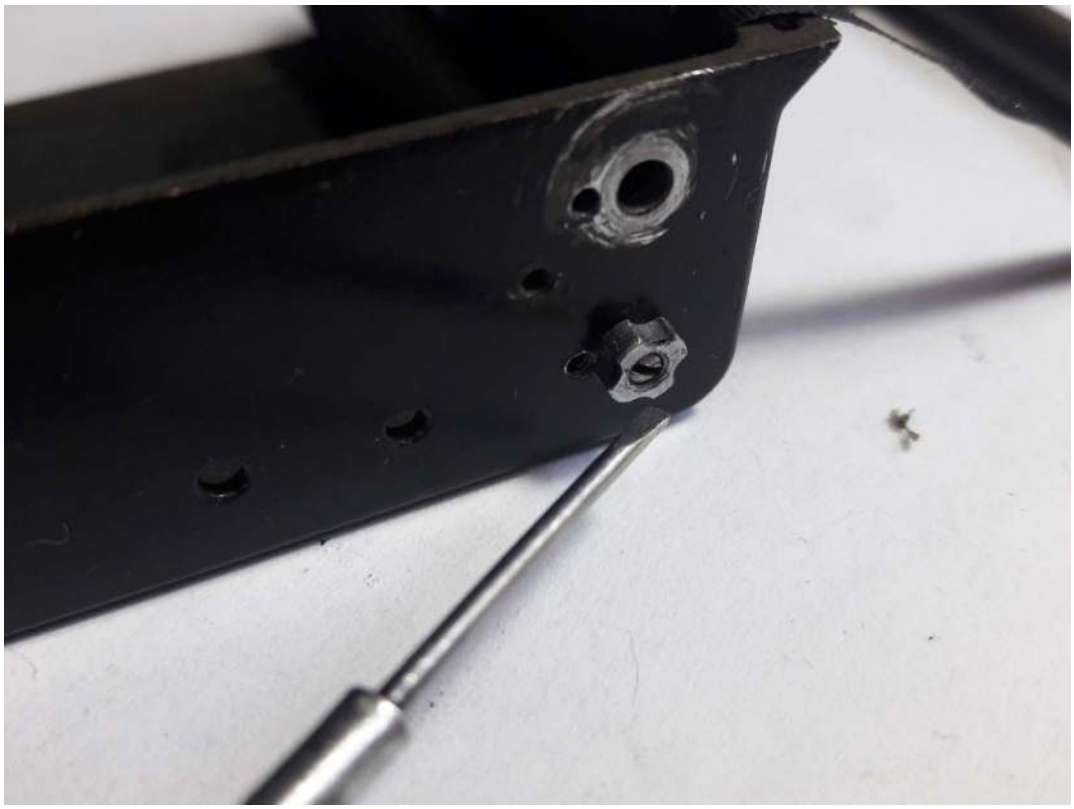
Turn the drum far most CCW until the 1st curtain and roller completely retract. Roll up the 1st curtain into the crate and seat it into place. Do not forget to add the bottom spacer and tubes in. Finally, secure the spring roller with the locking nut.

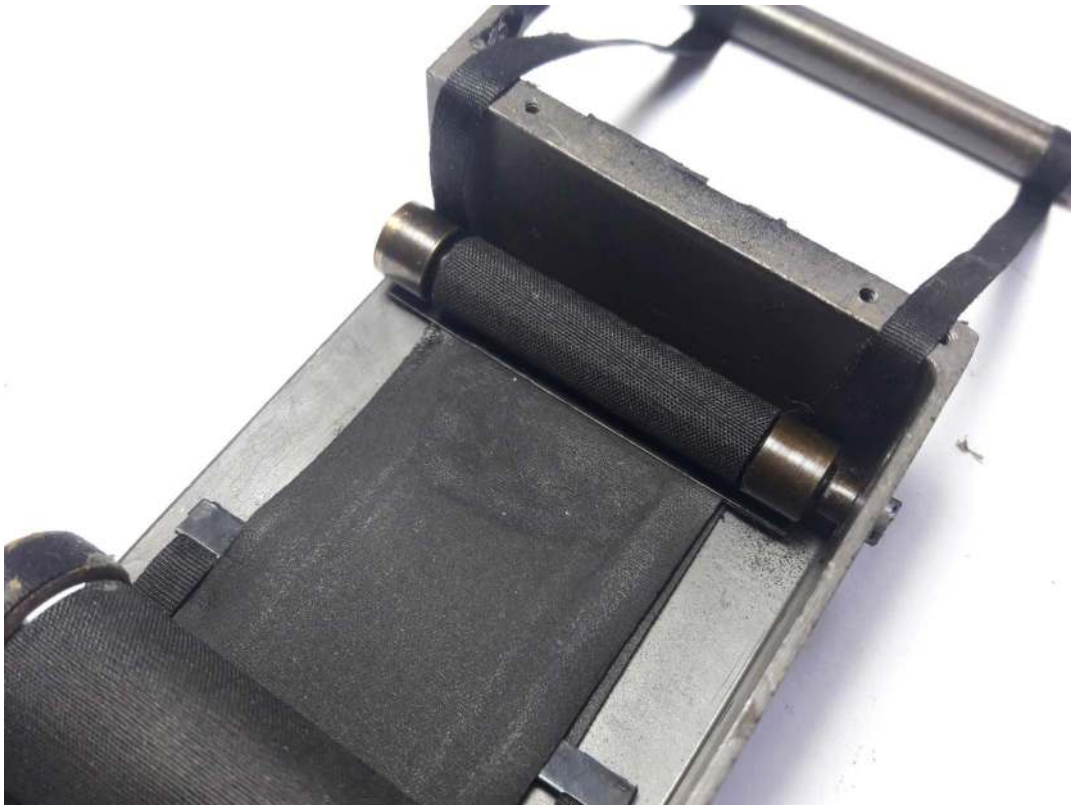






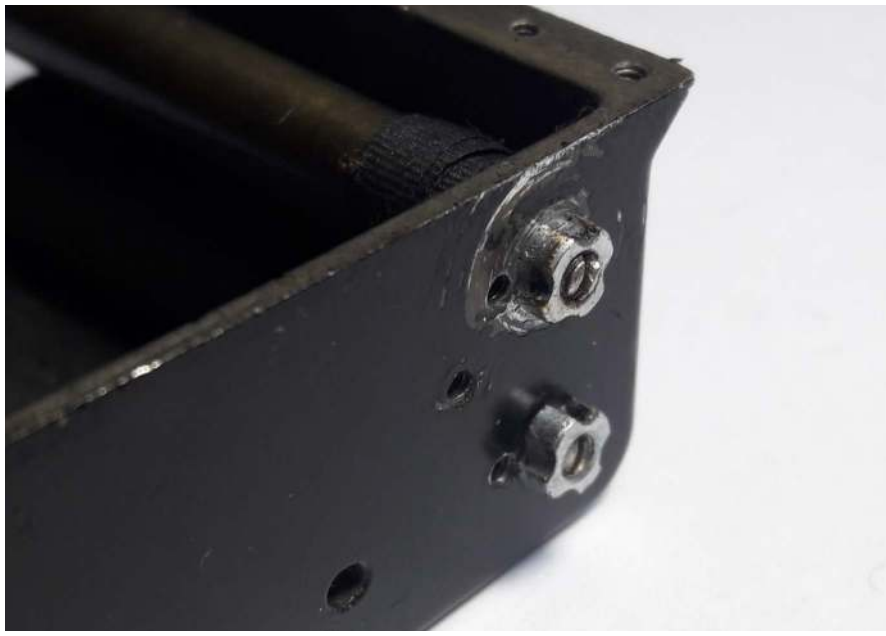
The curtain must now be tightened. Keep in mind, this is an inverted operation. Left turn will tighten, right turn will loosen. Lock nuts are also LH threaded, so turn them CCW to tighten, CW to loosen.

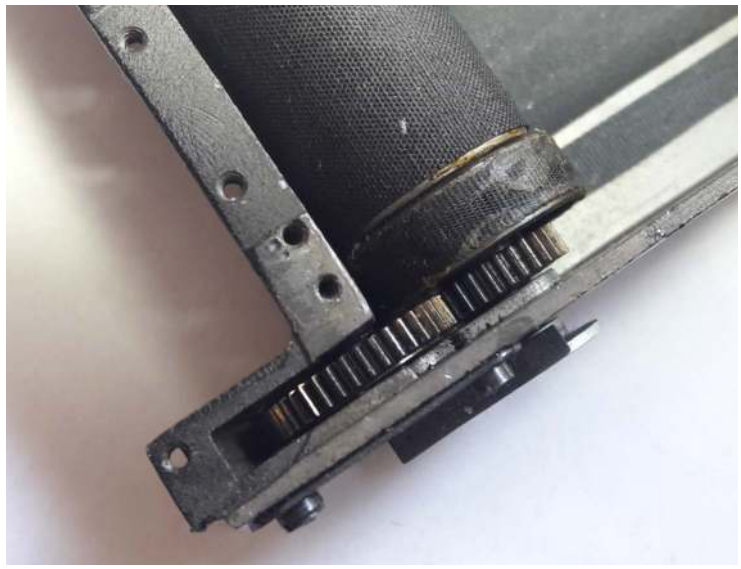




The curtain lath should line up with the roller and the curtain tightly wrapped around it. Do not over tighten the springs. Right now we need to make sure that both curtain laths line up and that the rollers have enough tension to travel.

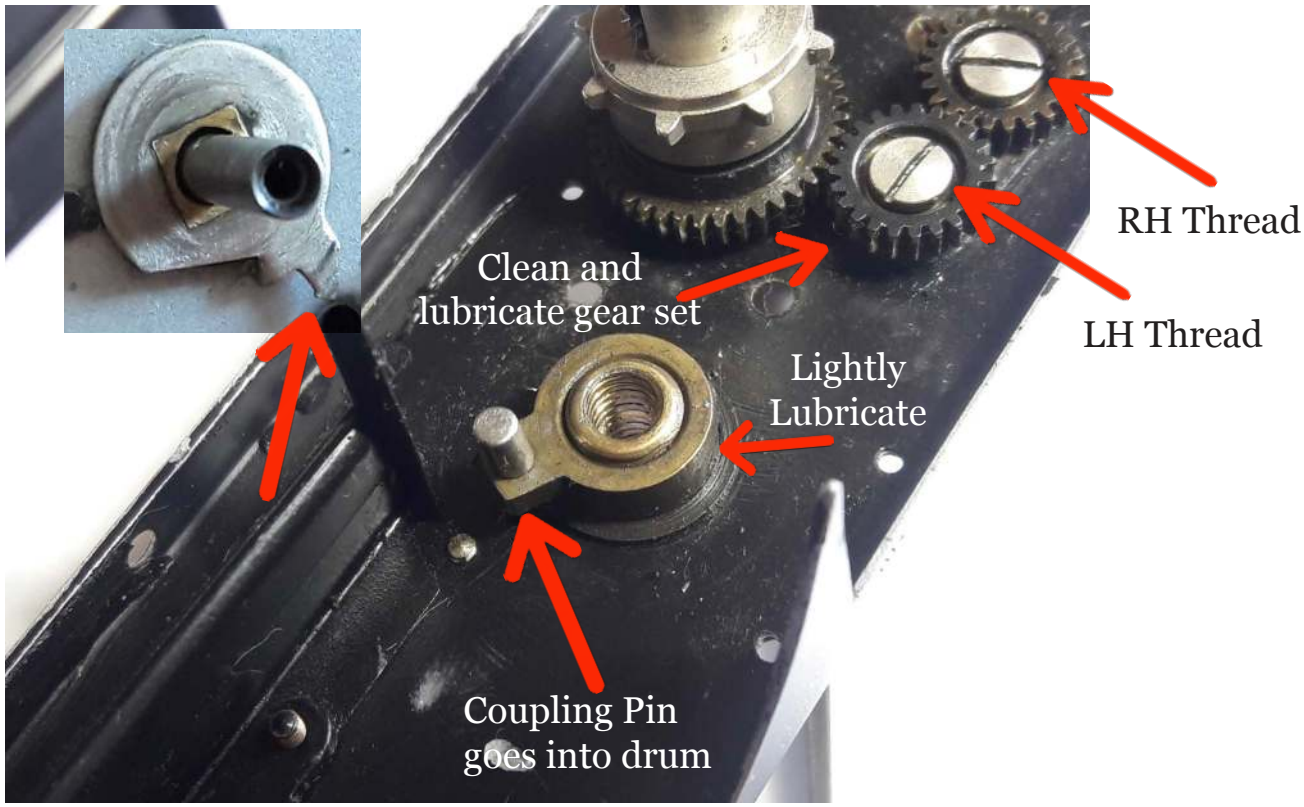
For the second roller, firmly wrap the ribbons around it and insert it into place. Secure it in with the locking nut. Tighten both spring loaded rollers until the curtain laths are in their original place.



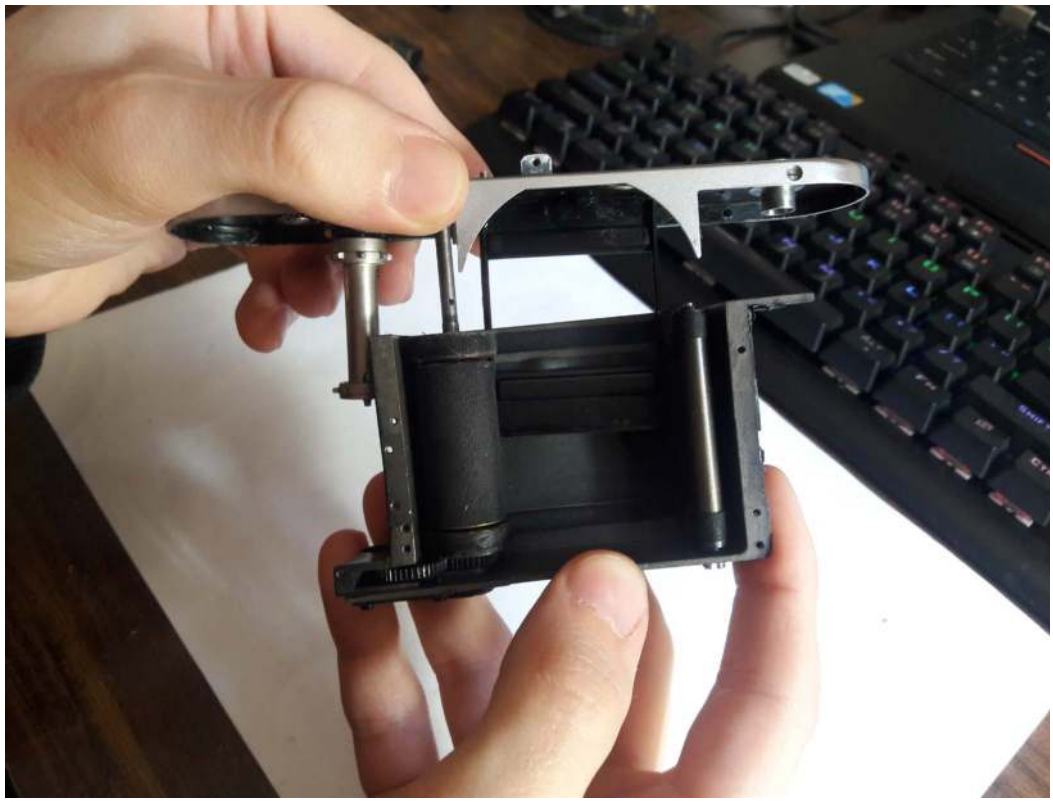


Reassembly

Clean and apply a fair amount of watch oil to the winding mechanism. Then, lightly lubricate the coupling pin with watch oil. Double check the laths and coupling pin hole position on the drum. Align the coupling pin with the coupling pin hole on the drum. Remember to insert the release / cocking gear into the main transport wheel before proceeding.



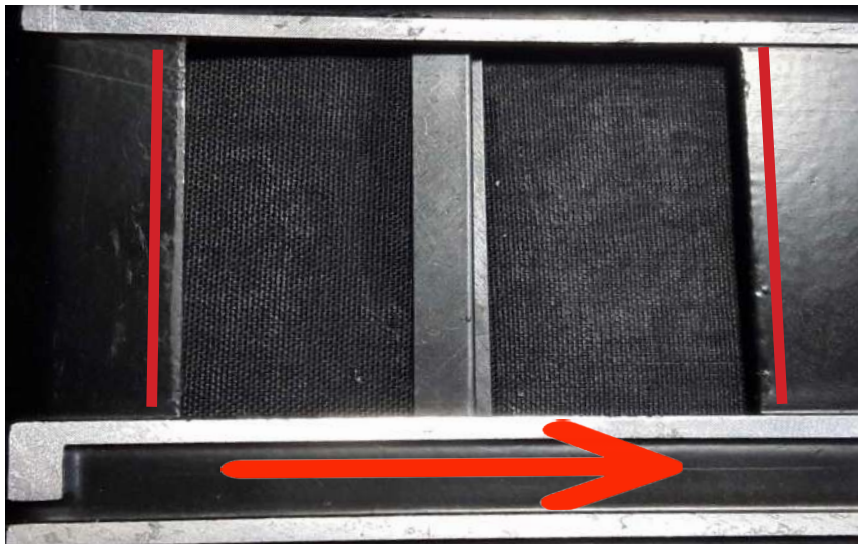
With one hand grab the top plate and with the other hand grip the drum and crate. Now, fit both the drum and release / cocking gear shaft through. Sometimes the release gear may get stuck during insertion. Wiggling and rotating of this piece will help it sit in place. Be careful with the light baffle.



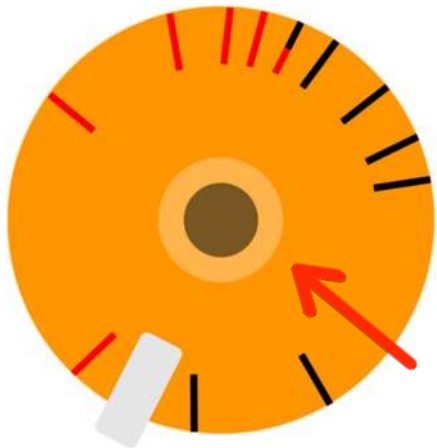
To make things easier, seat the rollers in first after running the drum through the plate. The coupling pin should sit in right after if done correctly. Double check the pawl and quickly screw down the crate from the two points shown below. Lubricate the roller shafts with watch oil after.

Push release / cocking
gear up to wind shutter again
If shutter stays open on bulb,
release brake latch from here
Trip shutter from here

Slowly wind the shutter and check the lath alignments. As the shutter is wound, the 1st curtain lath will slowly start to overlap the 2nd curtain lath. If there is any sort gap between the two laths or the laths are visible when the shutter is released, then readjustment is required. At this time, releasing the shutter will result in no exposure. This is quite normal since the speed dial, speed selector, and brake latch are not yet installed. Adding these components in will assure correct shutter functionality, minus the adjustments of course.



If the vertical alignment on the rangefinder is off, install the rangefinder first, then calibrate the vertical alignment (page 76 for vertical adjustment). The reason for this is because accessing the locking screw on the side of rotating mirror would be difficult with all the parts in the way and a little bit of force would knock the rotating mirror out of place. Proceed with caution.

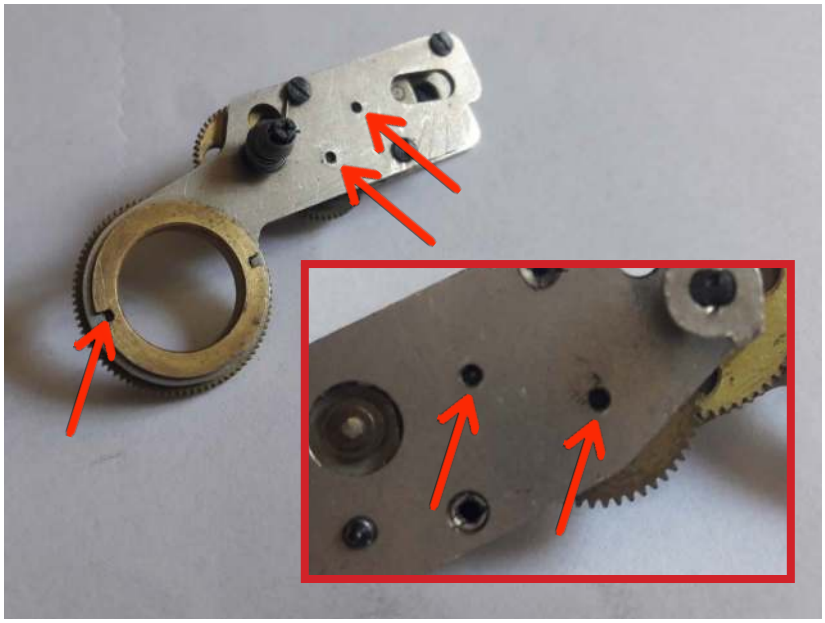


Add the speed dial to the shutter. The dial only screws in one way with the L shaped hook facing the 7 o'clock position (released). Make sure the screw is well fit or else the speed selector will not sit in place.

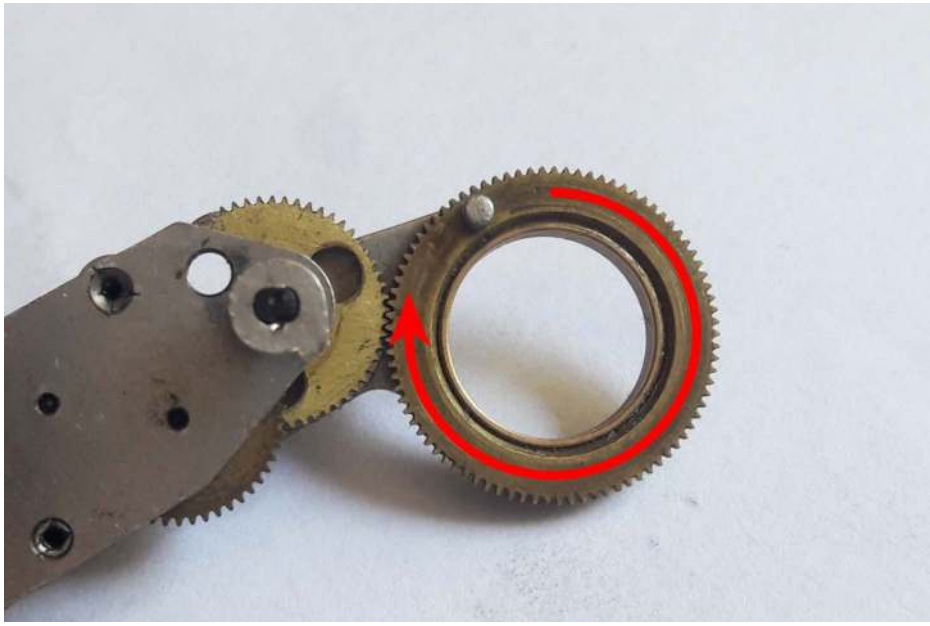
The brake latch should come next. Insert the brake latch with the spacer and spring tightly screwed down. Here you can see two different brake latches and springs from two different Zorki 4's (Left, 1972, Right, 1963). With the speed dial, speed selector, and brake latch in place, shutter speeds should now be activated. While testing the speeds, if one or two curtains do not complete their travel, tighten the spring rollers. Shutter speed adjustment will be done later. This is just to get a glimpse of how well the shutter is operating at the moment.

Add the self timer and release pin. If the self timer is not working, skip to page 61 for more information. Screw down the shutter release spring with the bolt and two screws. Do not add the bottom cover on yet. Test the shutter.

Lubricating and adjusting the slow speed escapement

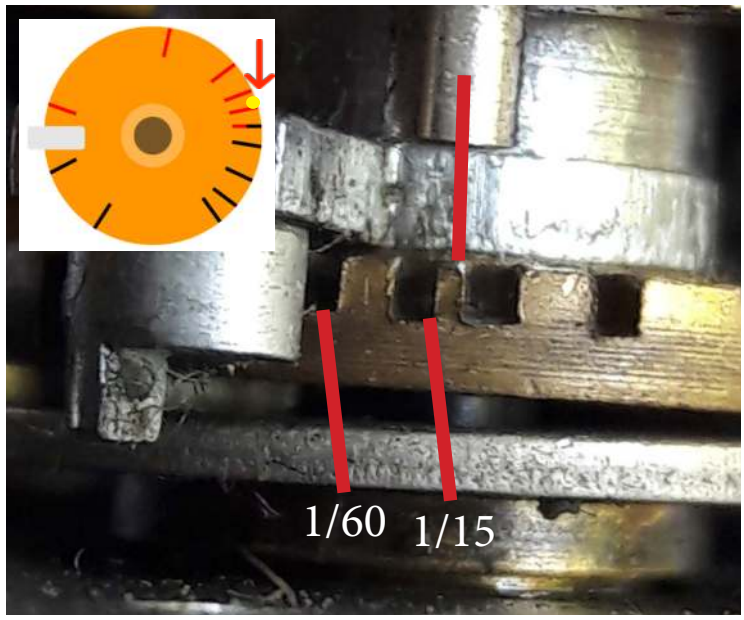


If you haven't yet, flush the entire slow speed escapement in cleaning fluid (Naphtha, acetone, etc). Apply watch oil to the gear shafts and work the mechanism a little.

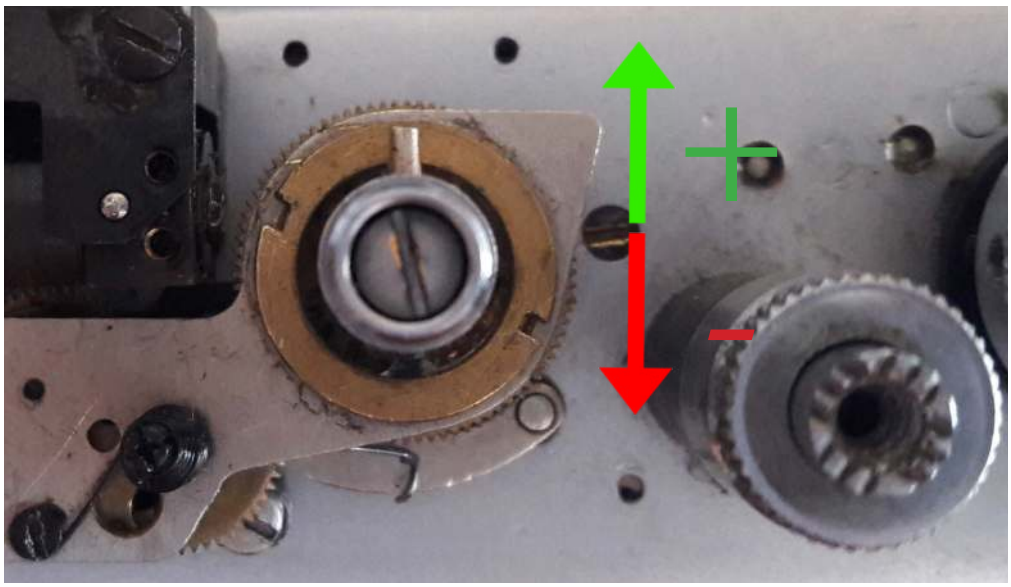


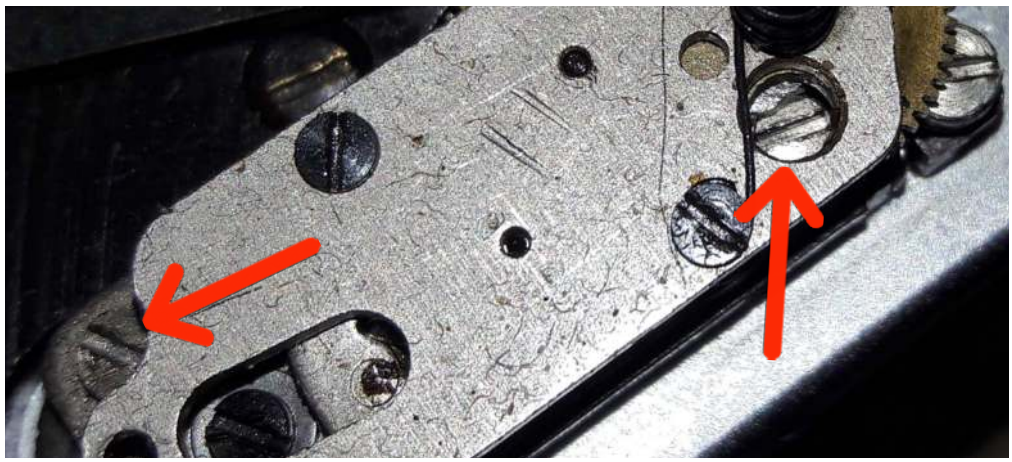
Before touching anything, remember to set the L shaped hook on the speed dial to the 12 o'clock position to fit the escapement through. To readjust the escapement, turn the main gear 2 revolutions. Factory setting is about 3, but that seems to make it difficult during speed selection due to the tension. Two turns is enough. After two turns, hold the gear tightly and do not let go. Place the escapement on the block, firmly hold it down with one finger, and release the gear. The snail cam should catch on to the delay arm after a bit of buzzing. It is okay to screw the escapement down at this point. If the mechanism completely unwinds, readjust and try again.

If the pin on the bottom gear is not in the correct position, the timings will not be correct. To adjust the gear pin position, unscrew the ring on top CCW until the bottom gear is free to move. The ring should sit in between 1/15 and 1/8. If the pin is too close to 1/60 it will not work or the shutter may even malfunction. Tighten the ring once finished.

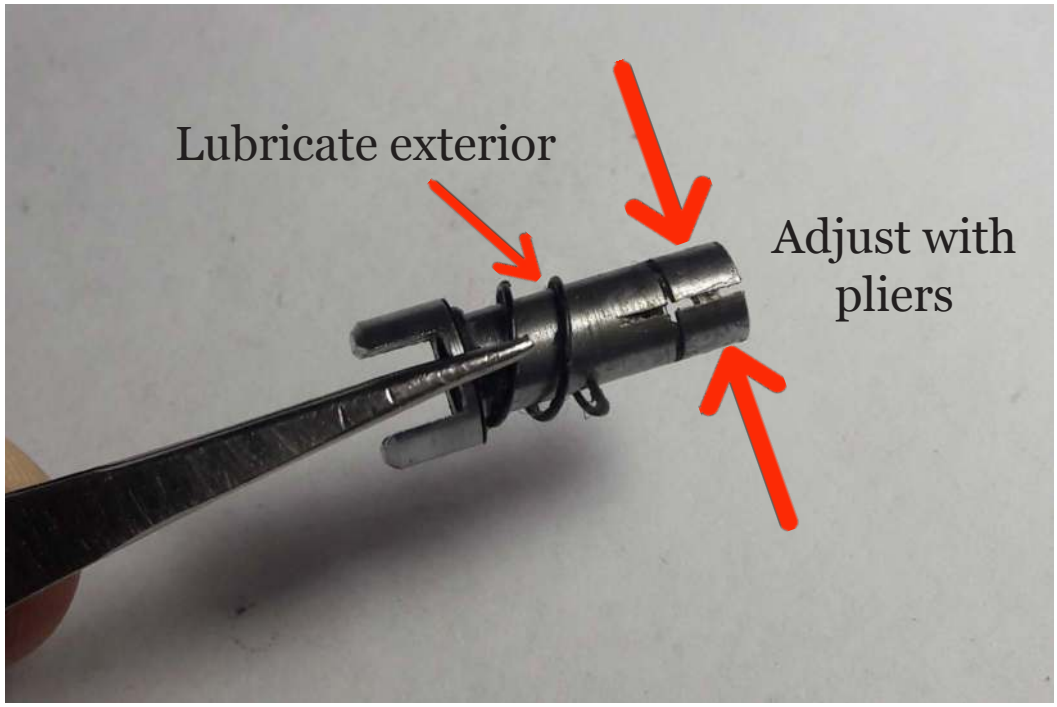


To adjust speeds, lightly unscrew the escapement and shift it up or down. Shifting forward will increase speeds, shifting back will lower speeds. It is very important to adjust for the 1/15 speed. If 1/15 is working properly the rest of the speeds should be okay. Screw down the escapement once finished, then test the shutter.

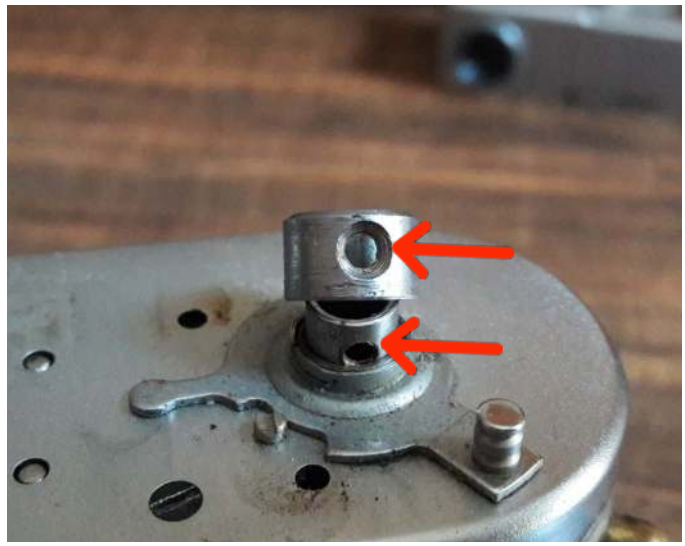


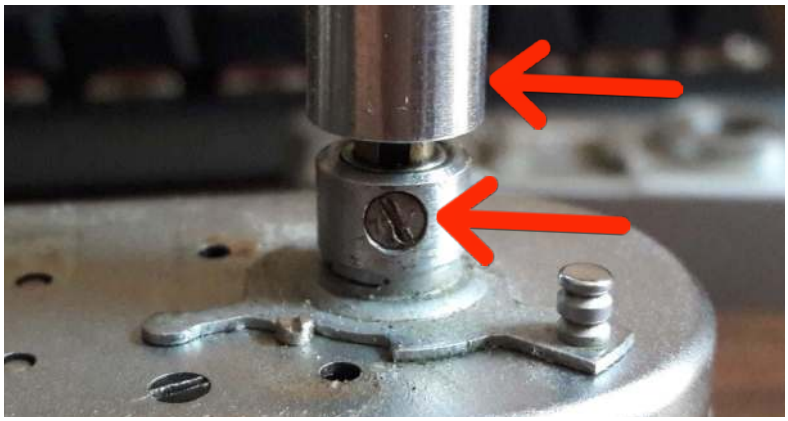


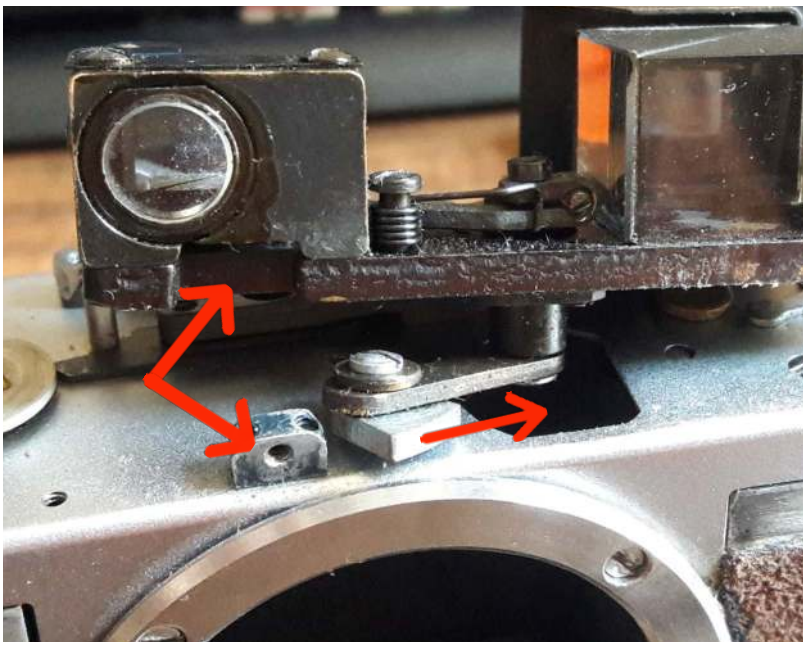
Adjusting and lubricating the rewind knob

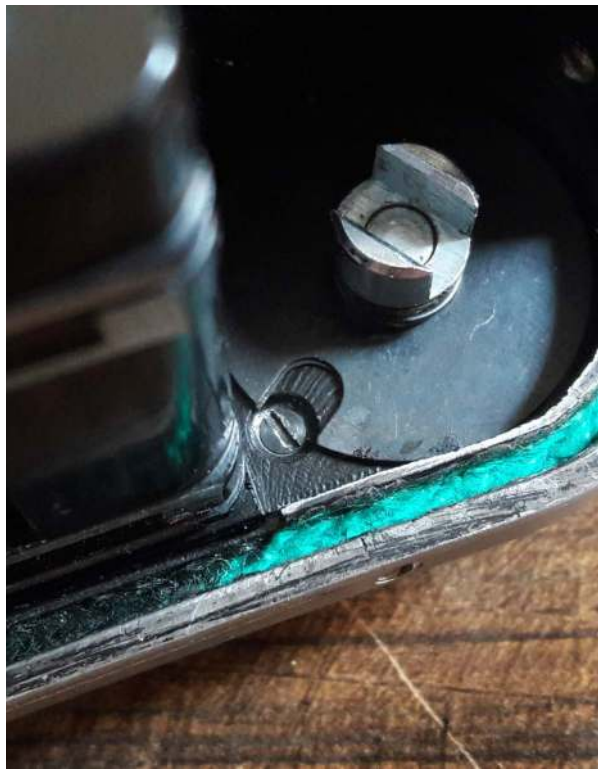


Sometimes the rewind knob will shift up and down freely because of the size of the shaft. This can be quite annoying when you're out using the camera. To resolve this issue, adjust the tip of the shaft using pliers. Be careful not to distort the shaft. You should only make minor changes. Lubricate the exterior and continue with the assembly.





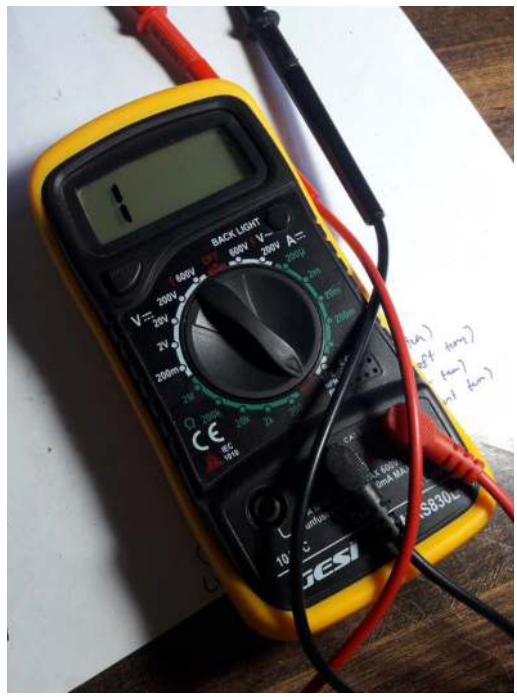




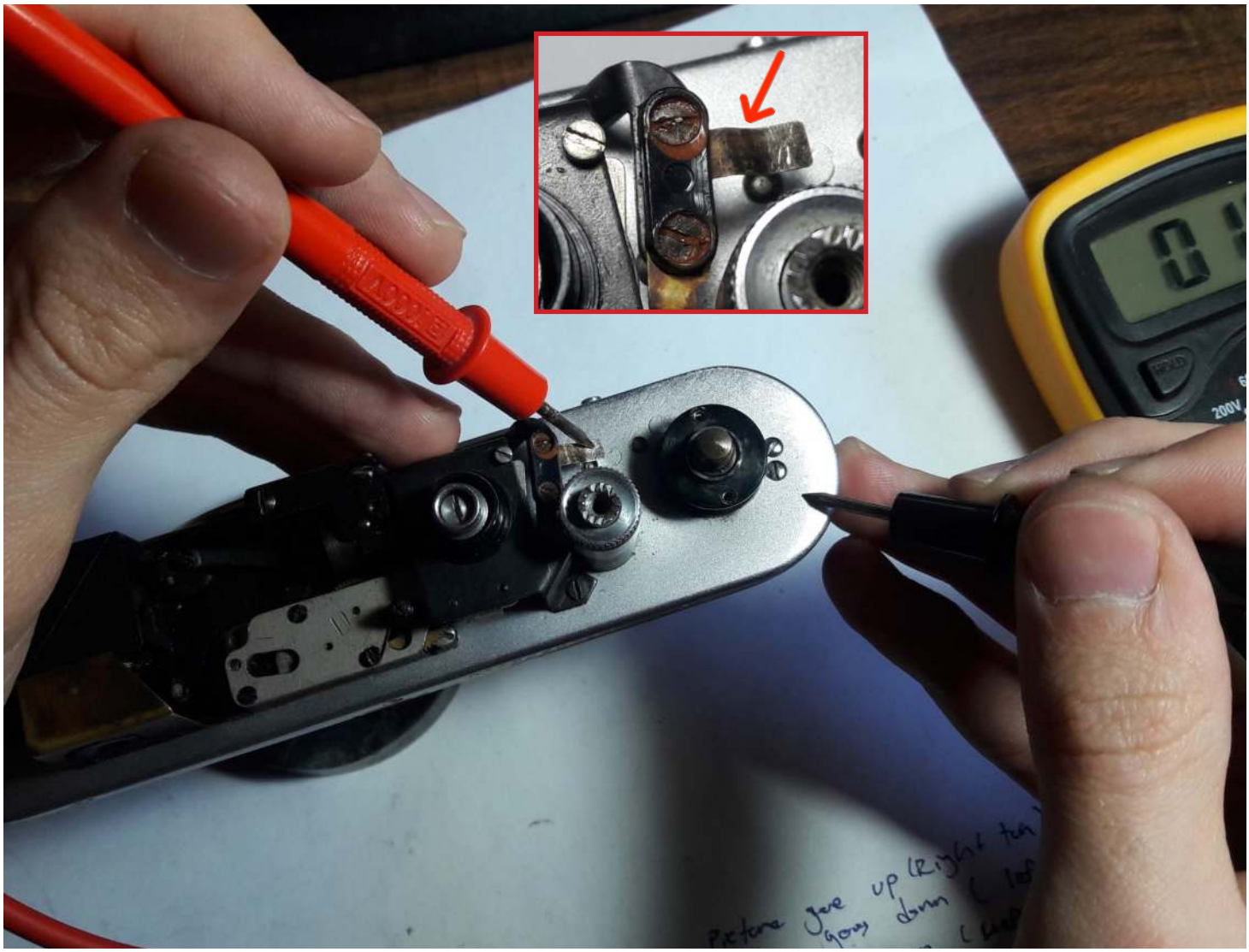
Tilt and insert the rangefinder arm into the hole. The groove near the rotating mirror window should sit into the block on the top plate. Secure the rangefinder from all 4 points.

Flash sync unit adjustment

For this part you'll need a multimeter. Set the multimeter to the continuity setting. It should look something like . The meter will emit an audible tone when continuity is detected between two points. Simply place one probe on one point, and another probe on another point and your meter will give you a visual and audible signal.

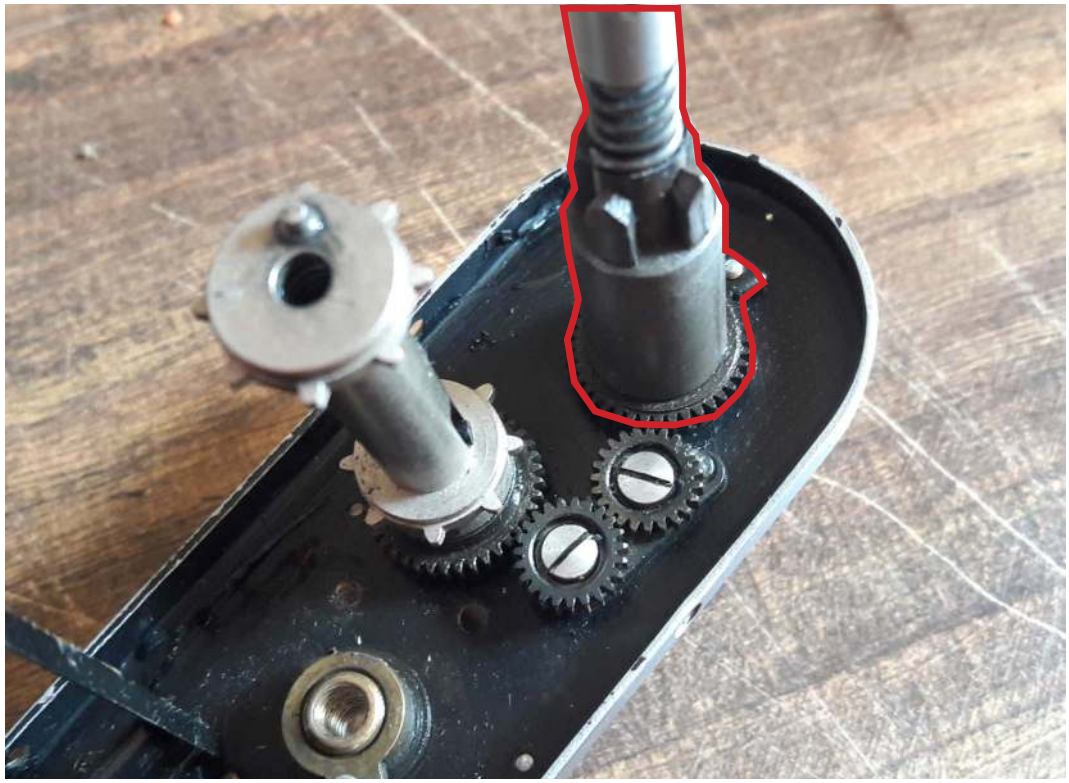


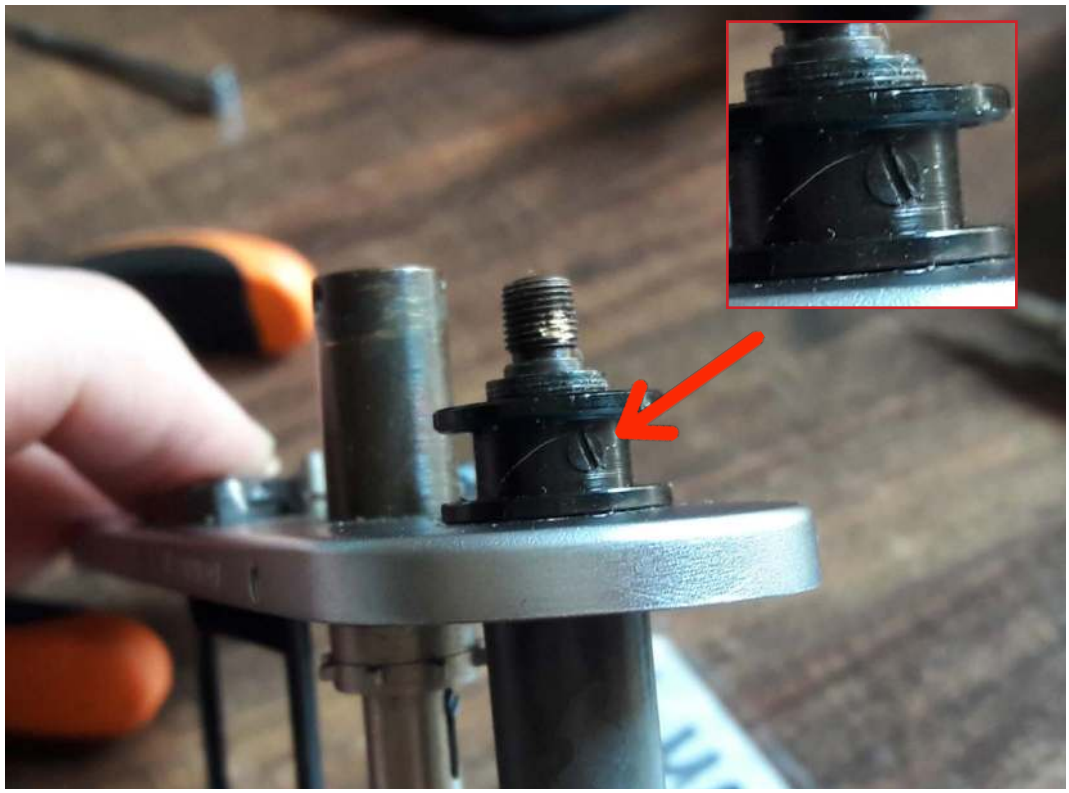
However, to actually obtain a signal the dial must be reset to the original “O” or “X” delay position. Release the shutter at any speed and lock the shutter release button down (press down and turn CCW). Place one probe on the flash sync contact and the other probe on the top plate. Slowly turn the flash sync dial until a signal is obtained. If a signal is obtained, the flash sync has been reset to the “O” or “X” delay position.



Winding mechanism

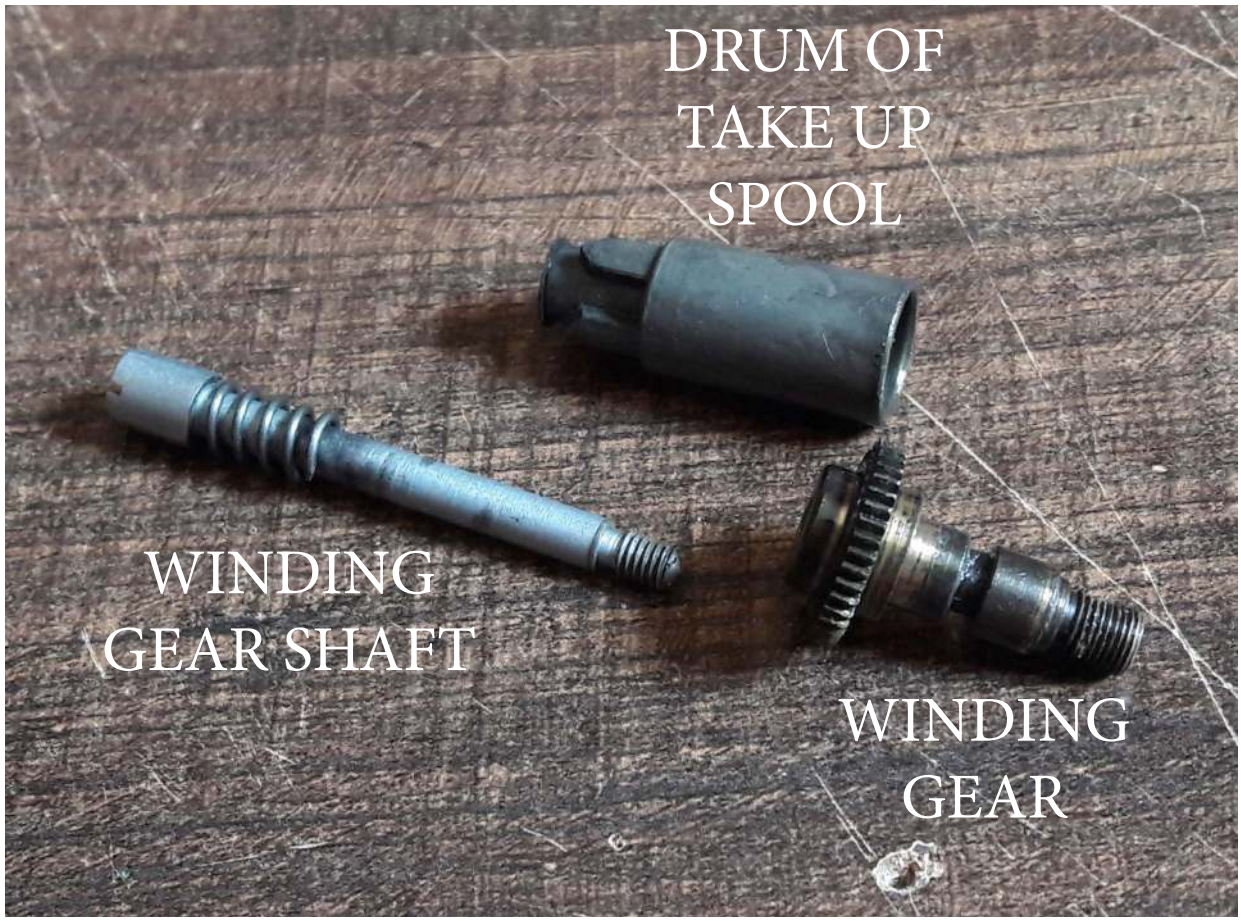
The winding mechanism is removed as follows: remove the winding knob (exposure counter dial does not need to be removed). Once the winding knob is removed, unscrew the screw on the spool, then unscrew the two screws holding the brake spring to the top plate (don’t drop the bolt). Then carefully take out the winding gear mechanism.





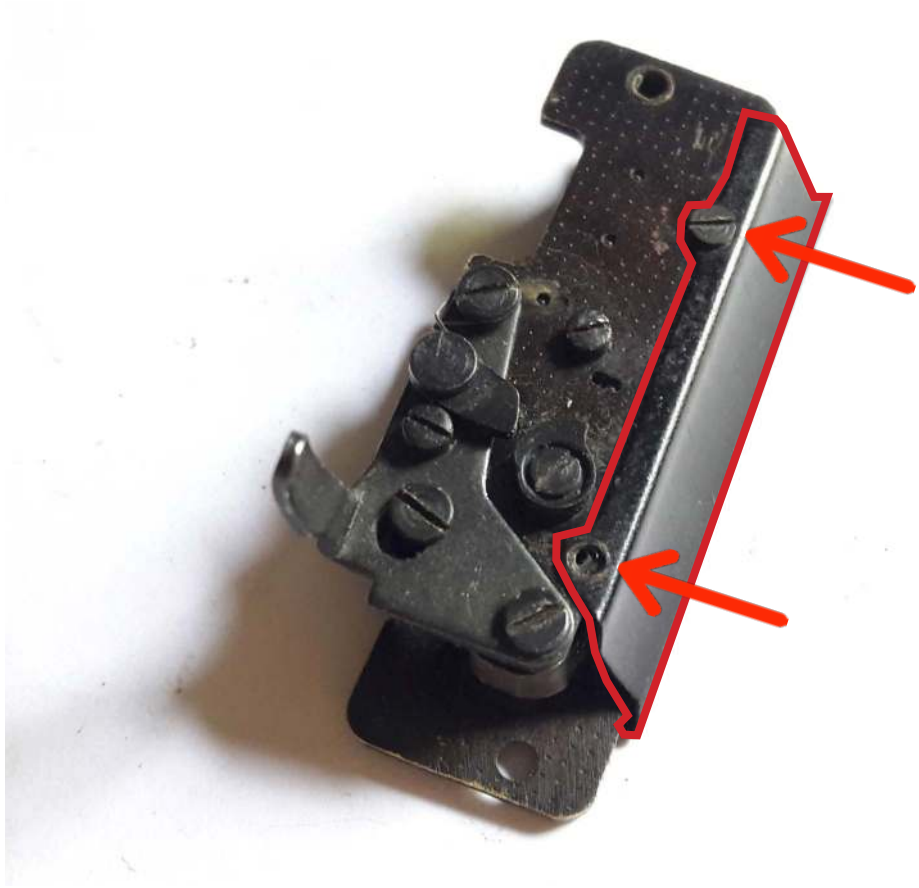
The two screws and bolt (below plate) hold the break spring of the winding gear in place. The break spring assures that when the shutter has been fully wound it will not release and that the winding operation only turns one direction, that being CW.

Clean the winding mechanism parts with preferred cleaning fluid and lubricate the shaft and gears with watch oil. Do not forget to add the ring back on the winding gear, or the winding mechanism will not work. Reassembly should be done in reverse order.

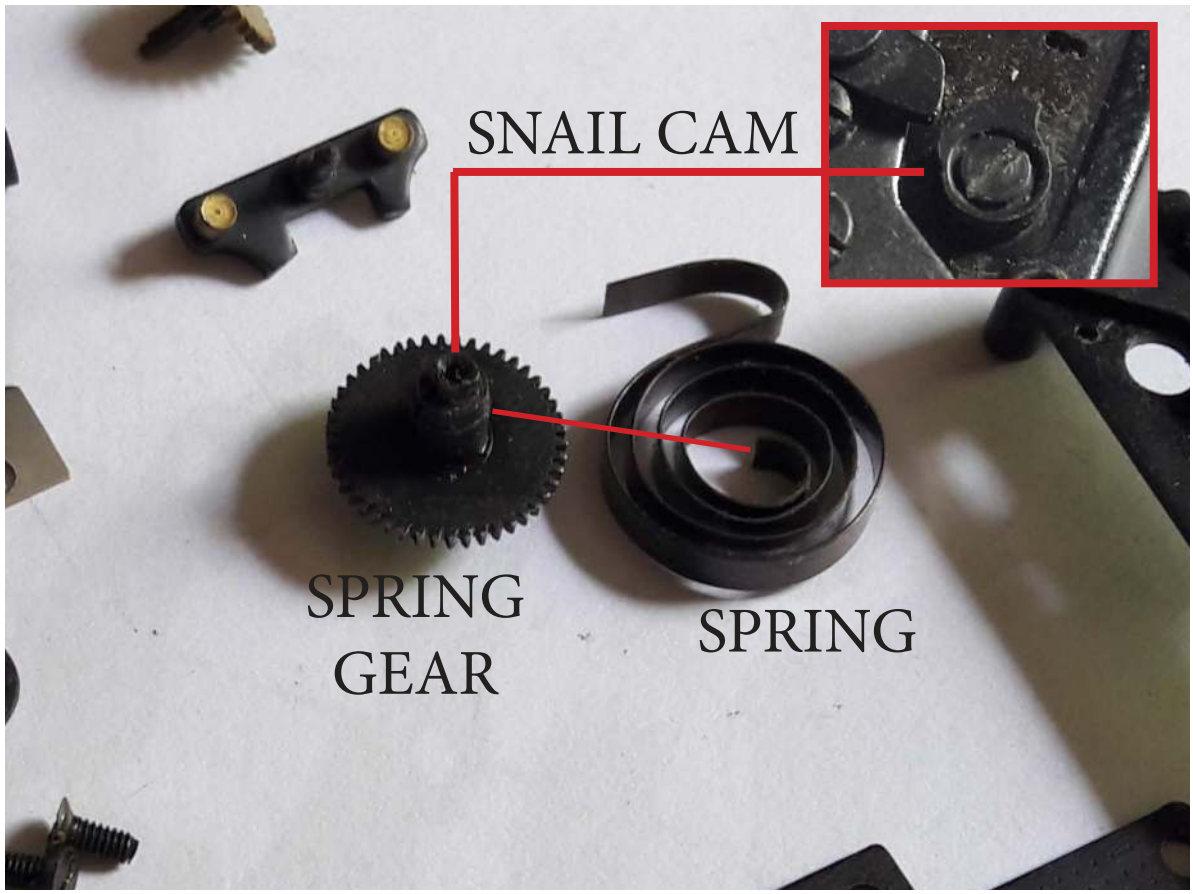


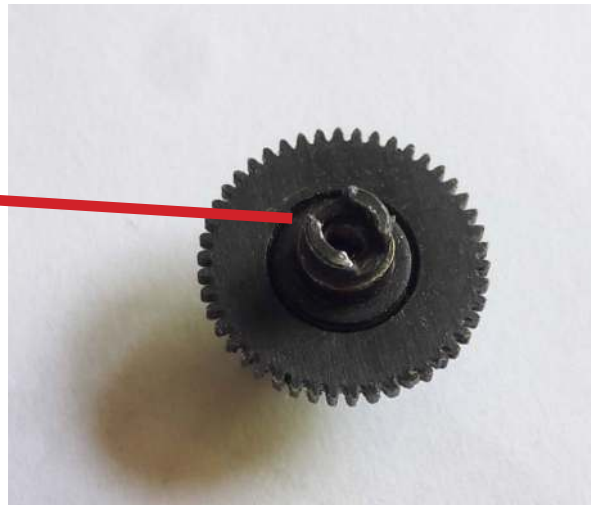
Self timer disassembly

Reassembling the self timer can be quite difficult, so continue at your own risk. Start by removing the side shield first. There are 2 screws that hold it down.

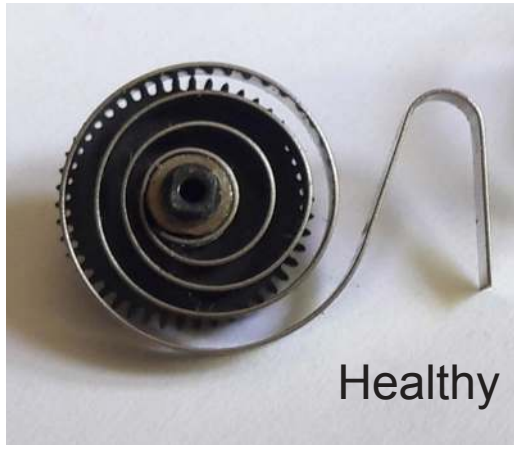


Remove the three screws that hold the two plates together and the stop ring around the self timer lever thread. Everything should come apart now. Do not remove the self timer release trigger.

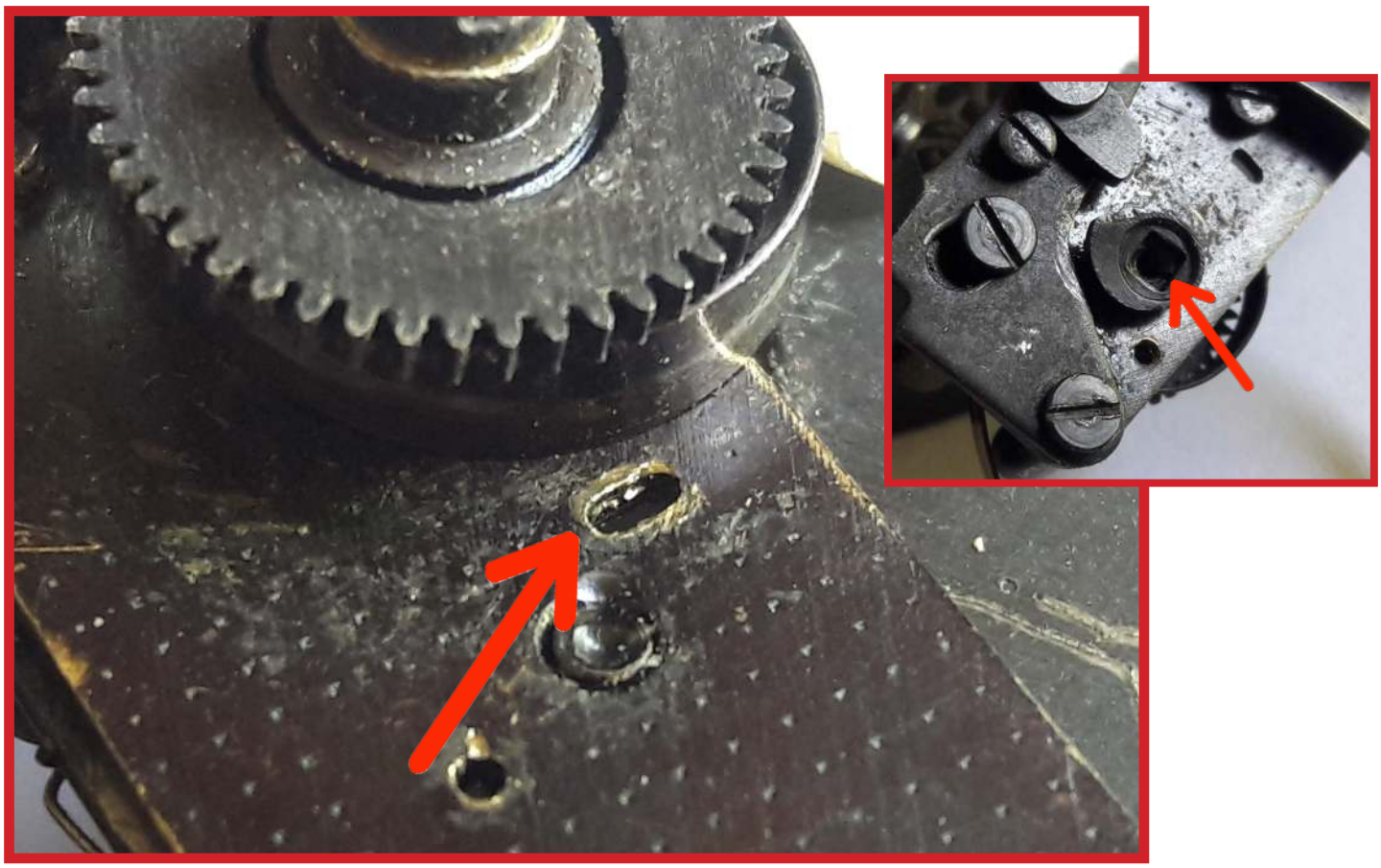




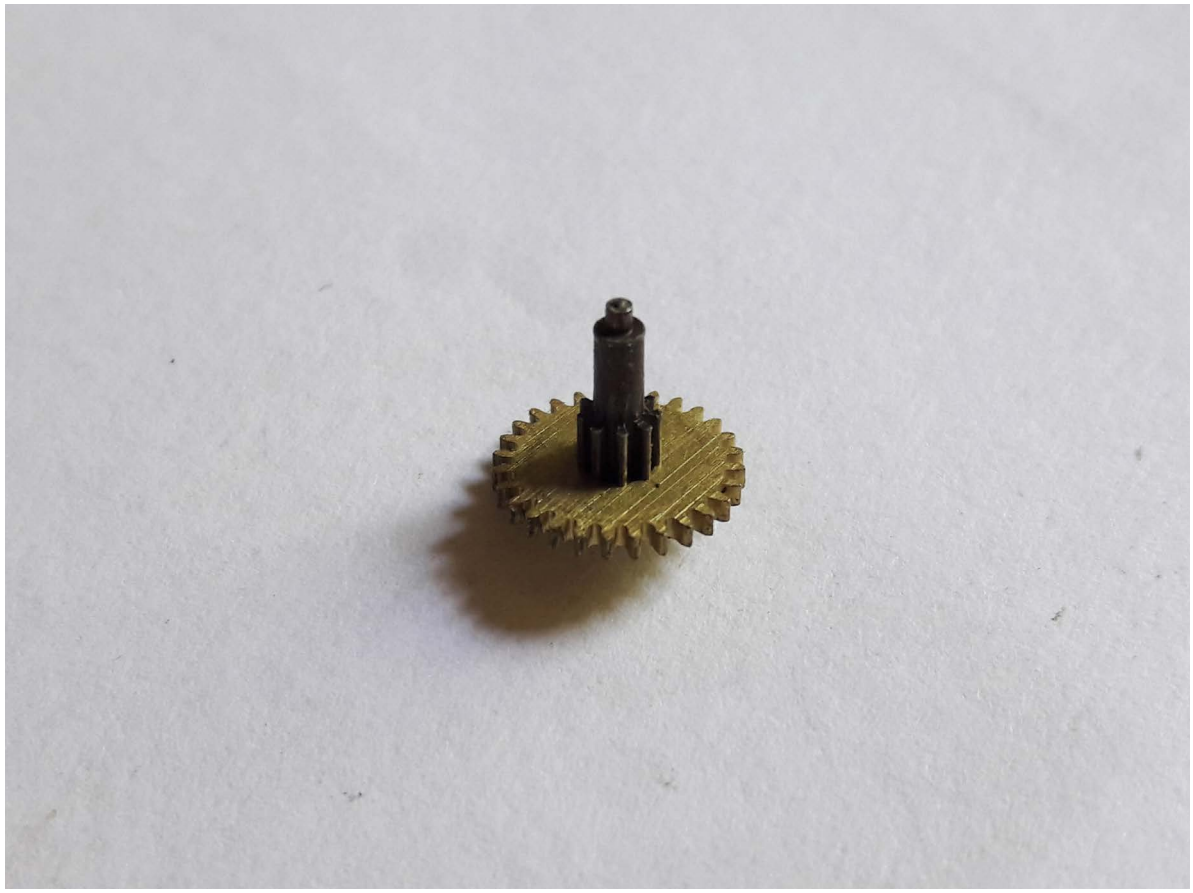
This self timer screw was a victim to corrosion and broke off inside the thread of the spring gear due to excessive torque. The spring gear can be drilled out or of course, replaced if parts are available.

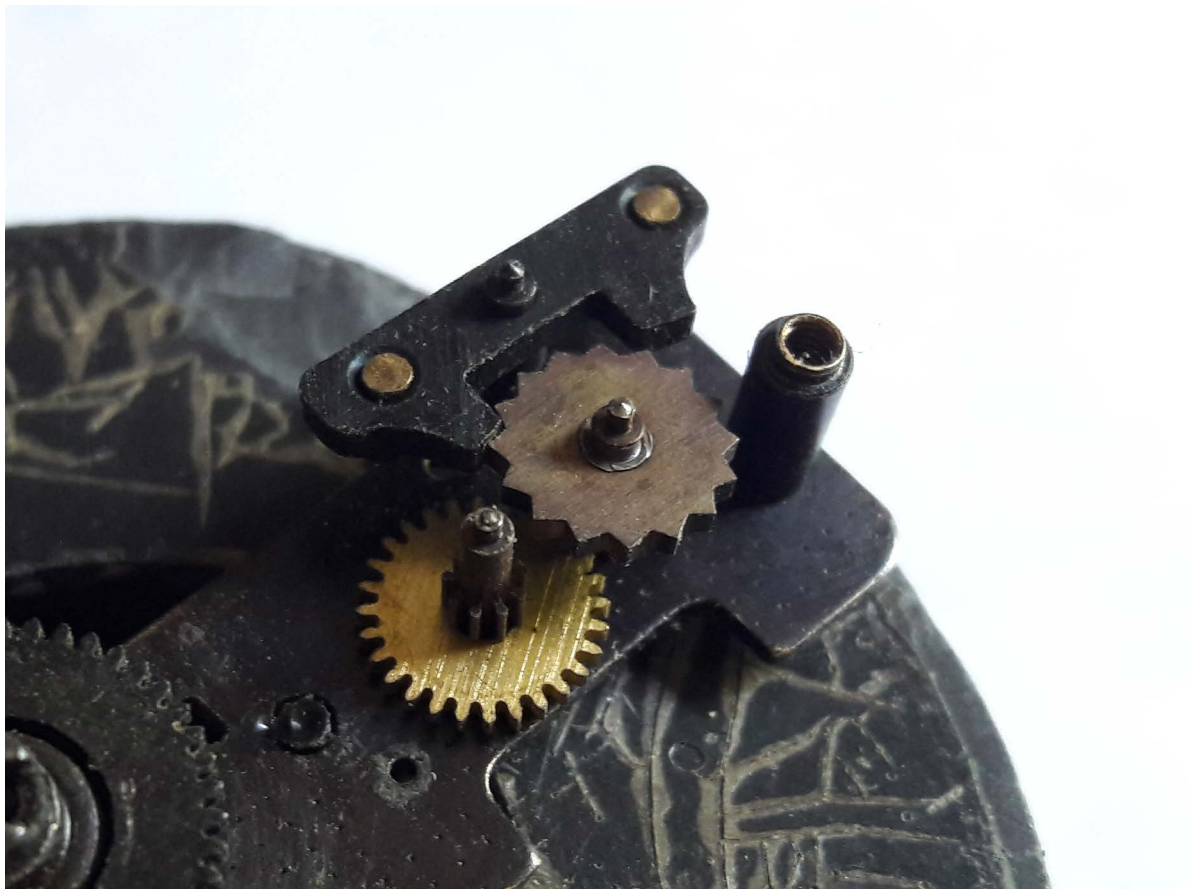


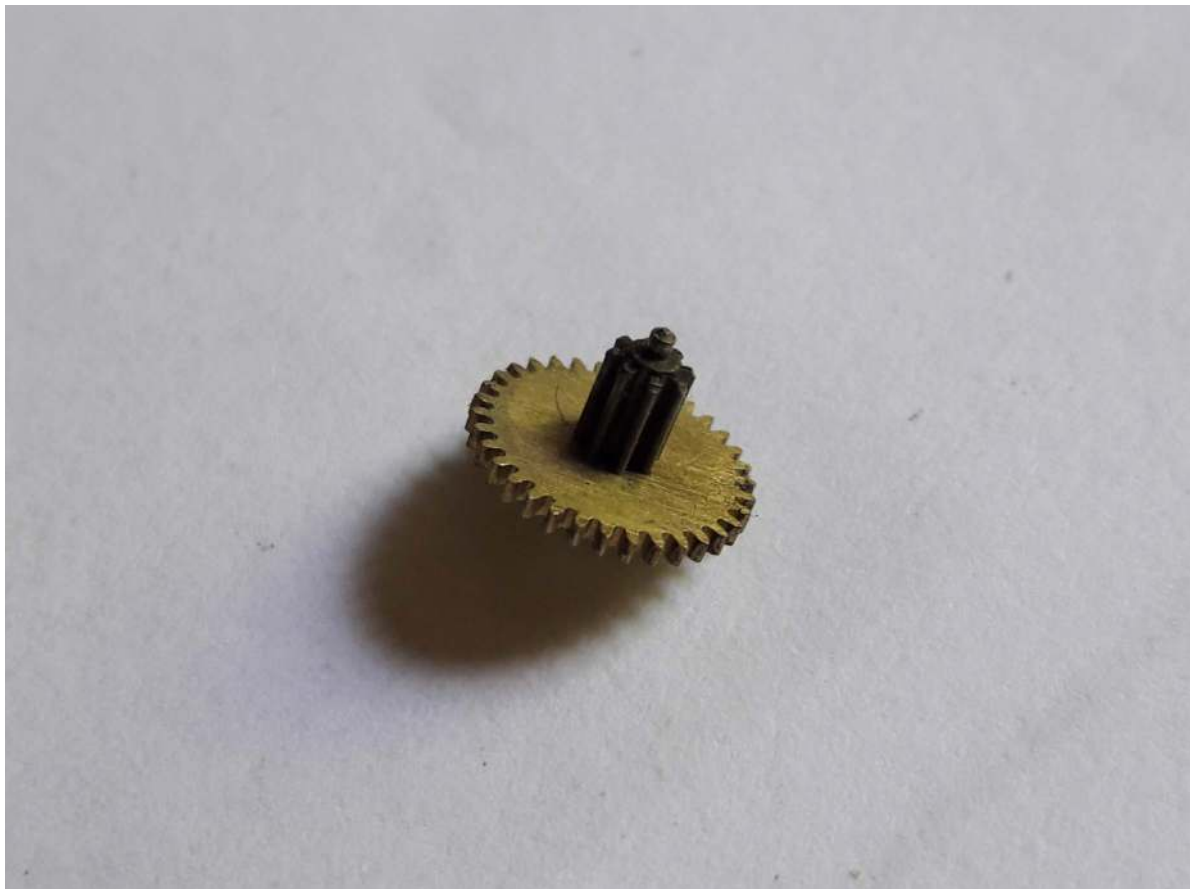
Depending on the size of the spring once discharged, it may need to be stretched out in order for one of the gears to be inserted into place during assembly. Remember to screw down the snail cam from the back side to avoid slippage. I used a magnet to keep the plate steady and taped the end of the spring to the side of the magnet. This also works well for stationing gears during assembly.

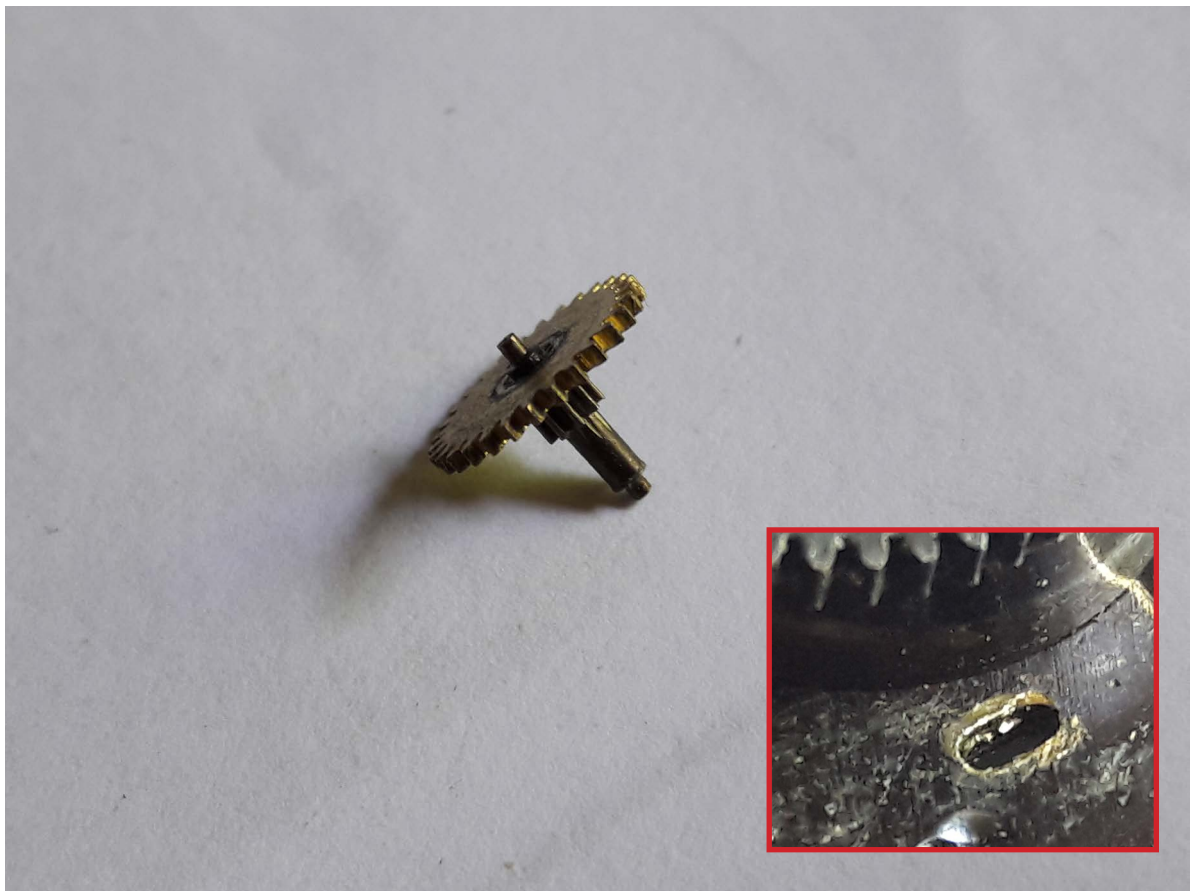


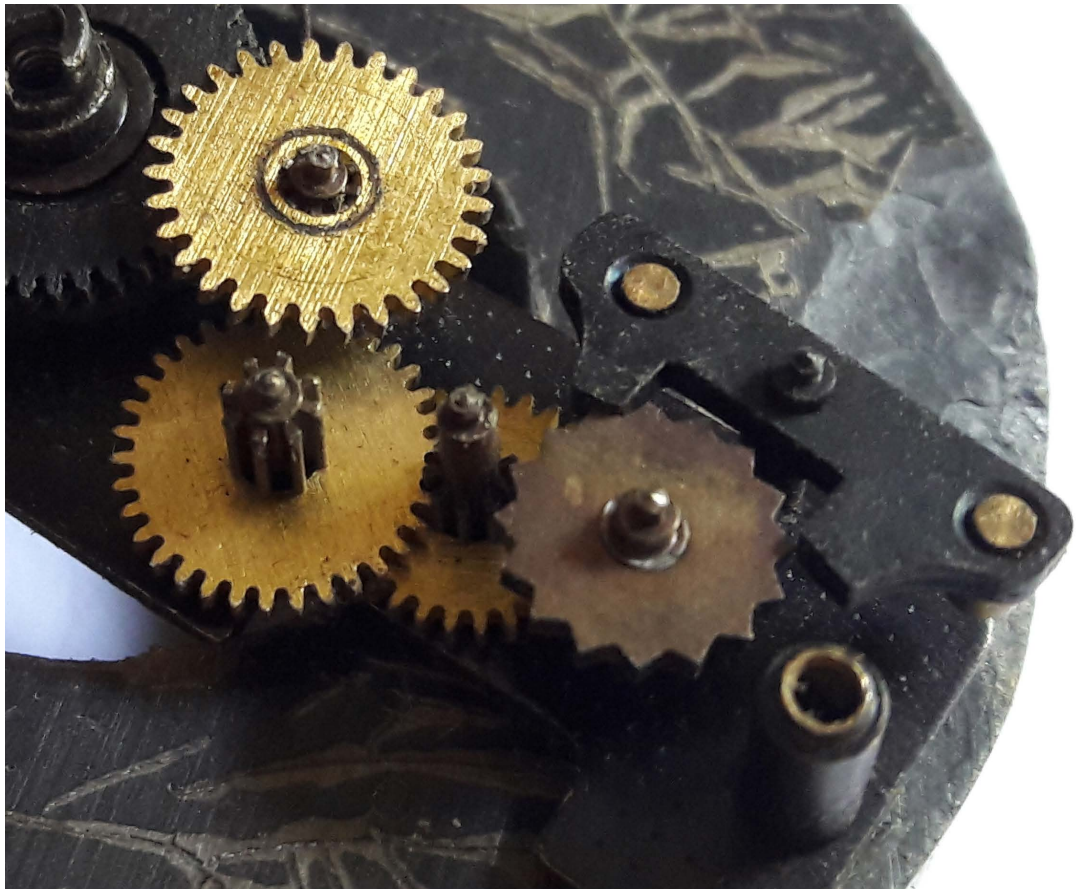
Do not insert this piece in backwards or the mechanism will not work.

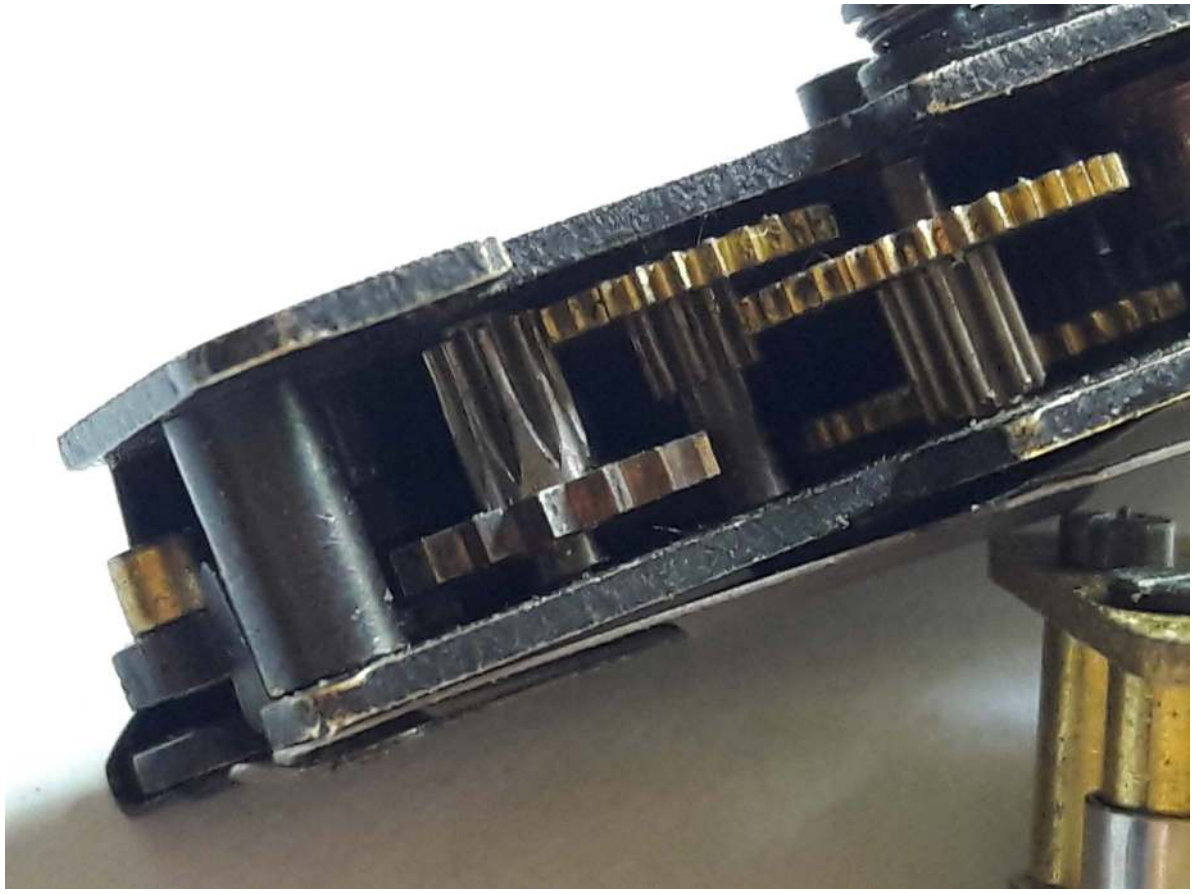








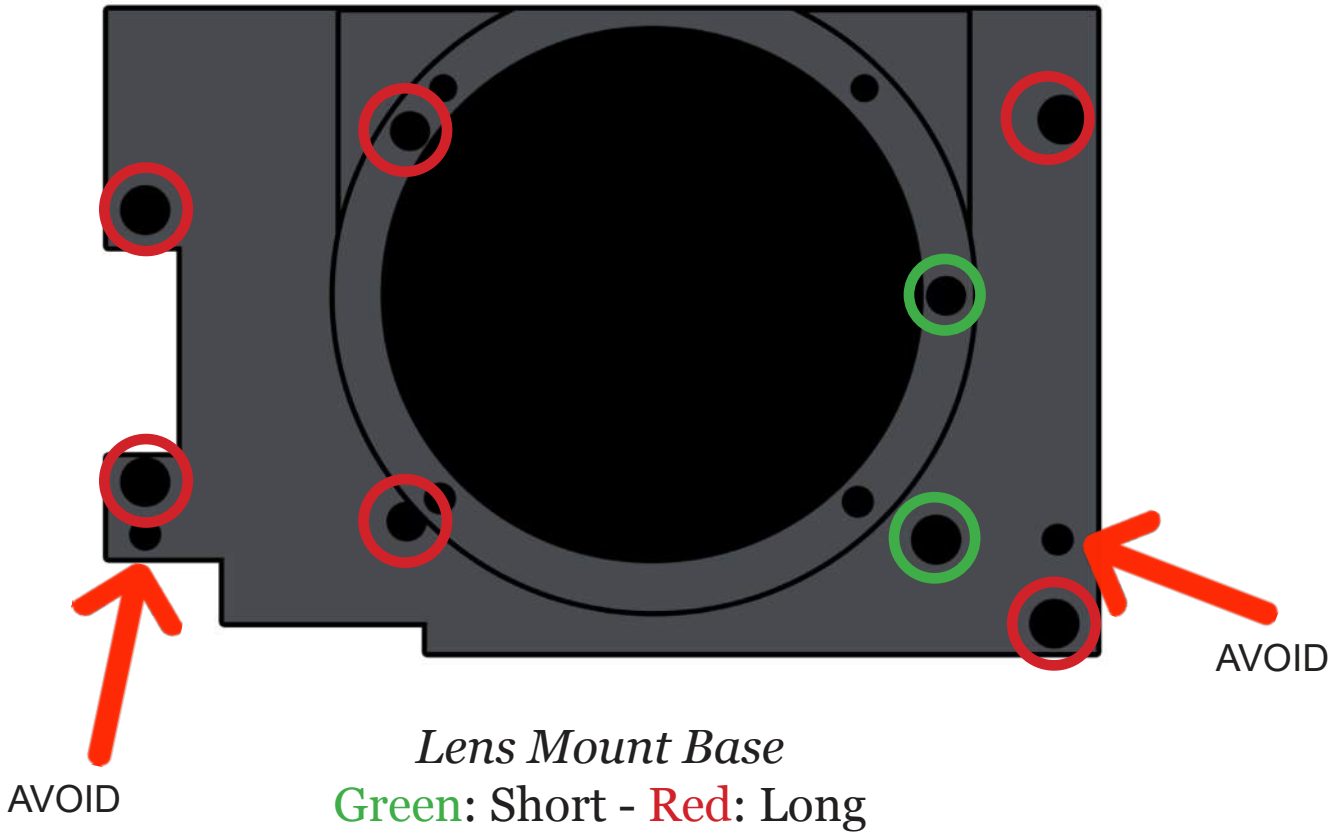




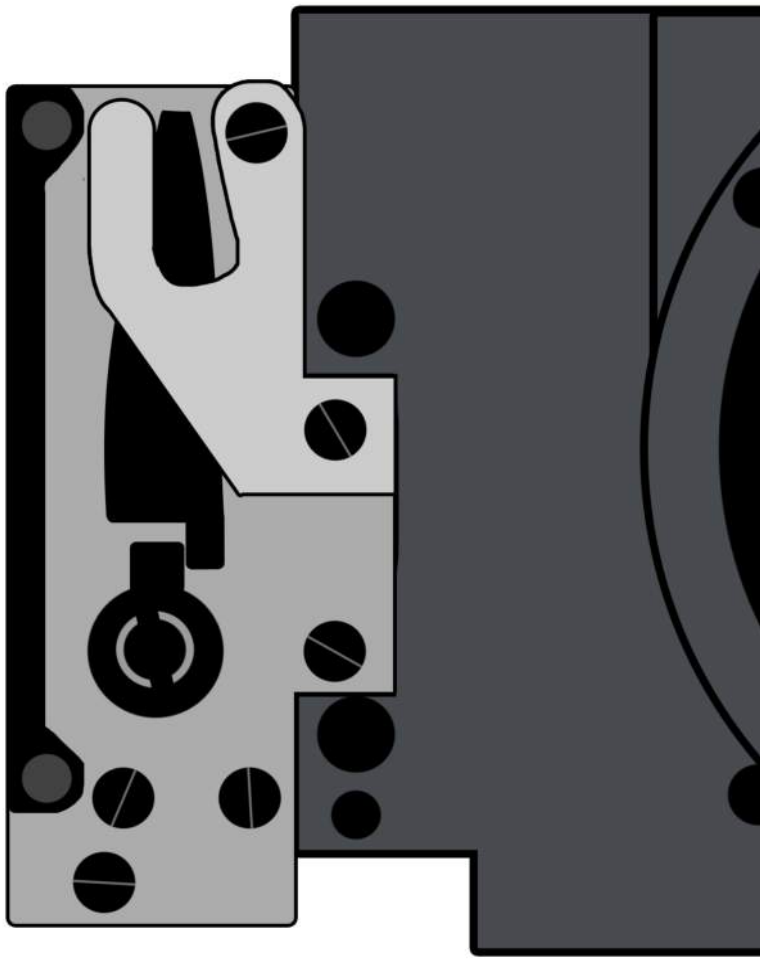
Add the top plate on, lightly screw it down, and seat the gears in. Once all the gears are seated, fasten the plate screws down. Station the spring and tension it. The self timer lever can be added for assistance. Insert the black stop ring around the thread. Finally, apply watch oil to the gear shaft points. If all is done correctly, the mechanism should work.

Nearly identical Zenit self timer
(Can not be mounted on the Zorki 4)

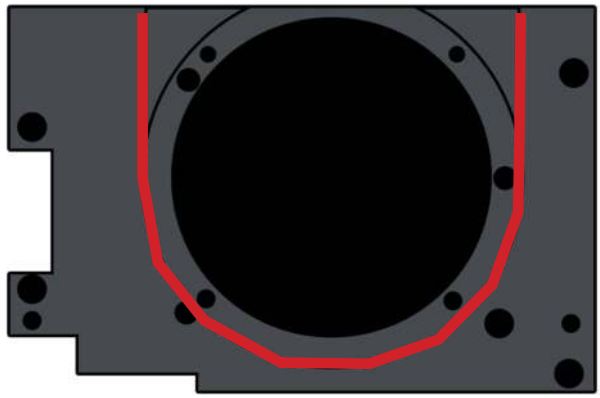
Insert the light baffles into the crate and fit them on the sides of the center light baffle. Then add the lens mount base on.



Lens Mount Base
Green: Short - Red: Long



Note the light seal material on the base. If the original light seal was removed glue it back on. If it's missing, then add light seal material before sliding the shell on. This is to avoid any sort of light leaks.



Slide the shell on then screw it down from the 7 points. Remember, the two below the mount are a little longer in length and go into the shutter crate. After the shell is secured add the self timer arm. Zorki 4's usually have a RH threaded self timer screw, but this particular Zorki 4 is a 72xxxxxx model with a LH thread. Some 63xxxxxx models may have LH screws as well, which I have come across a few times.

Flange distance calibration

The flange distance is the distance from the lens mount to the film plane. In order to achieve correct focus, the flange distance needs to be adjusted within the appropriate range. The correct flange distance between the film plane and mount is **28.80mm -+ 0.02**. In other words, measurements should be between **28.78mm** and **28.82mm**. If the cameras distance exceeds these measures, adjustment is required.

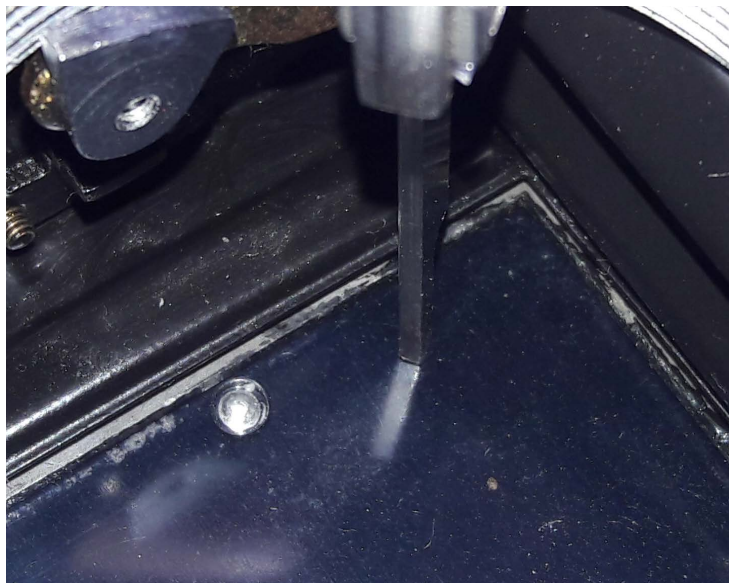
There are several tools to measure the flange distance: A caliper with a depth gauge reader, a depth gauge caliper, an indicator, depth gauge indicator, and so on. The tool pictured above is an electronic caliper with a depth gauge reader. I highly advise you use a tool with a base to make measuring easier and accurate.

Placing the shims where they originally were will not guarantee the correct flange distance. You will never know if the mount was altered by the previous owner, or if the factory placed shims are even accurate after all these years. Temperature and storage conditions will or may have altered the distance, so adjusting will be required. Also, note that not only do the shims play a roll in achieving correct distance, but also how well the screws are tightened around the mount. Over tightening on older Zorki / Fed models with no base mount will result in lens morphing. If the lens mount has been morphed, mounting the lens and focusing would be near impossible. However, the Zorki 4 is excluded in this.

Put the back cover on and lock it in place. Make sure the pressure plate is on the back cover. Readings will be made from the lens mount ring to the pressure plate base. Add a few shims around the mount base for now. This will be used for the first 4 readings. Removing and adding will be necessary since this is not a one time operation. If you don't have any shims, or you feel that you need more, they can simply be made from paper.

Sometimes the lens mount can be screwed on the wrong way because there are no indications to which way to the lens mount should be mounted. This would be a nightmare after a flange distance adjustment. A simple way to resolve this issue is by screwing a lens to the lens mount. The focal length indicator on the lens will indicate which side the lens mount should be screwed on to the body. Mark the back side of the mount for future reference.

Try to keep the caliper as flat as possible if a base is not present when measuring. Also, the pressure plate is springy and will shift towards the back of the case if pressure is applied. This will give inaccurate readings. Stop measuring once you feel the depth rod has touched the pressure plate. Take notes, remove the mount, add shims, and repeat until all four corners are within the correct distance.



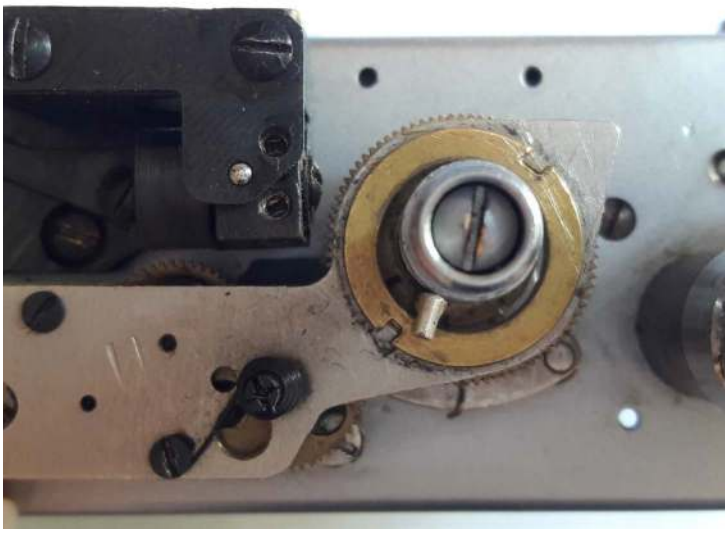
28.78, 28.79, 28.80, 28.81, 28.82 (mm)

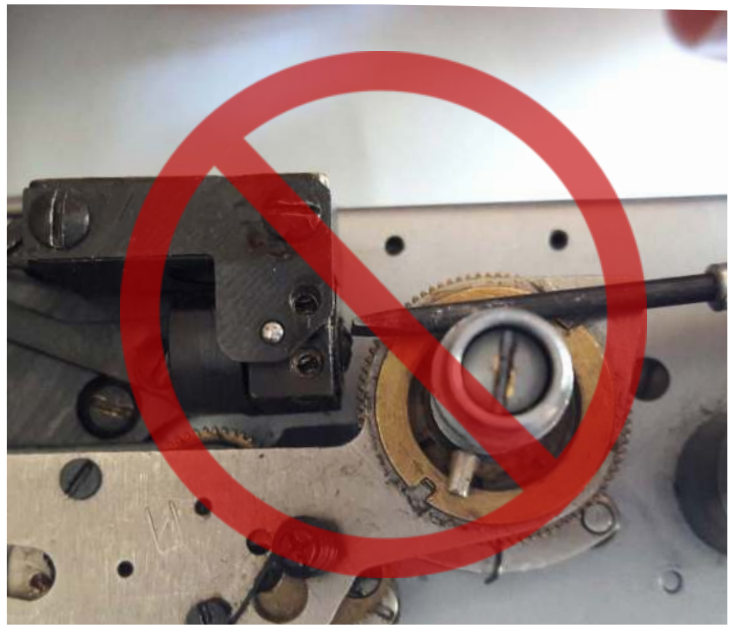
Rangefinder calibration

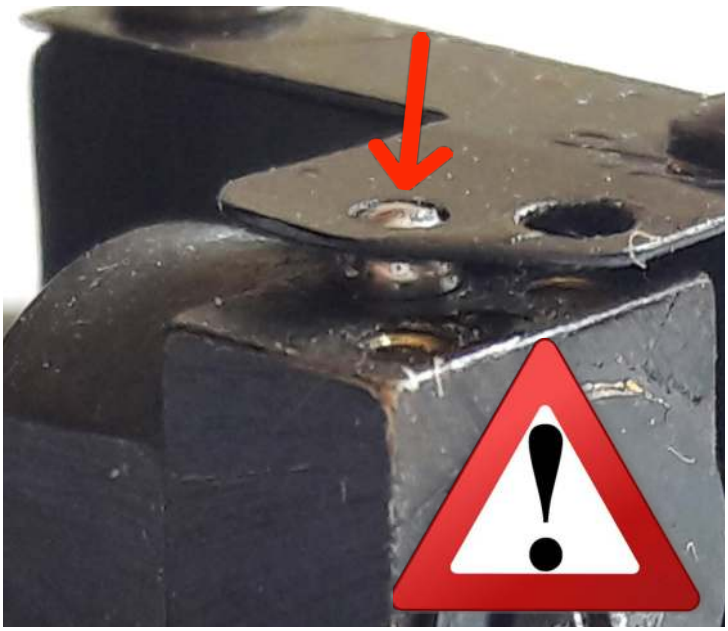
Unlike Leica or most rangefinders, Zorki and Fed's are tuned a bit differently. Due to the nature of the soviet rangefinder system, not only is an infinite focus adjustment required, but also a close up 1 meter adjustment. The 1 meter adjustment is done by altering the rangefinder cam with pliers and the infinity adjustment is done by turning the screw near the viewfinder window. For setting the vertical alignment, the top cover needs to be re-moved.

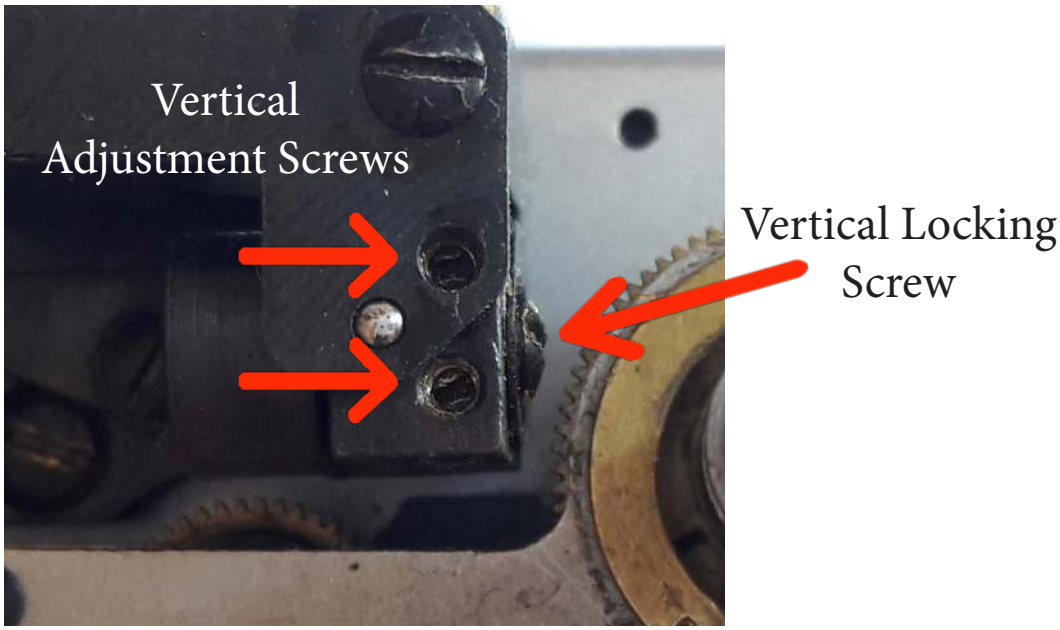
Vertical alignment

Since the flash sync, speed selector, and slow speed escapement are blocking access to the locking screw on the side of the rangefinder mechanism, they will have to be re-moved. Forcing the locking screw to turn, especially when there is no room to work around, will knock the rotating mirror out of place. There are two micro ball bearings that assist in the rotation of the window and will fly out if excessive amount of force is applied to the rotating mirror. Without these, the rangefinder will not operate.









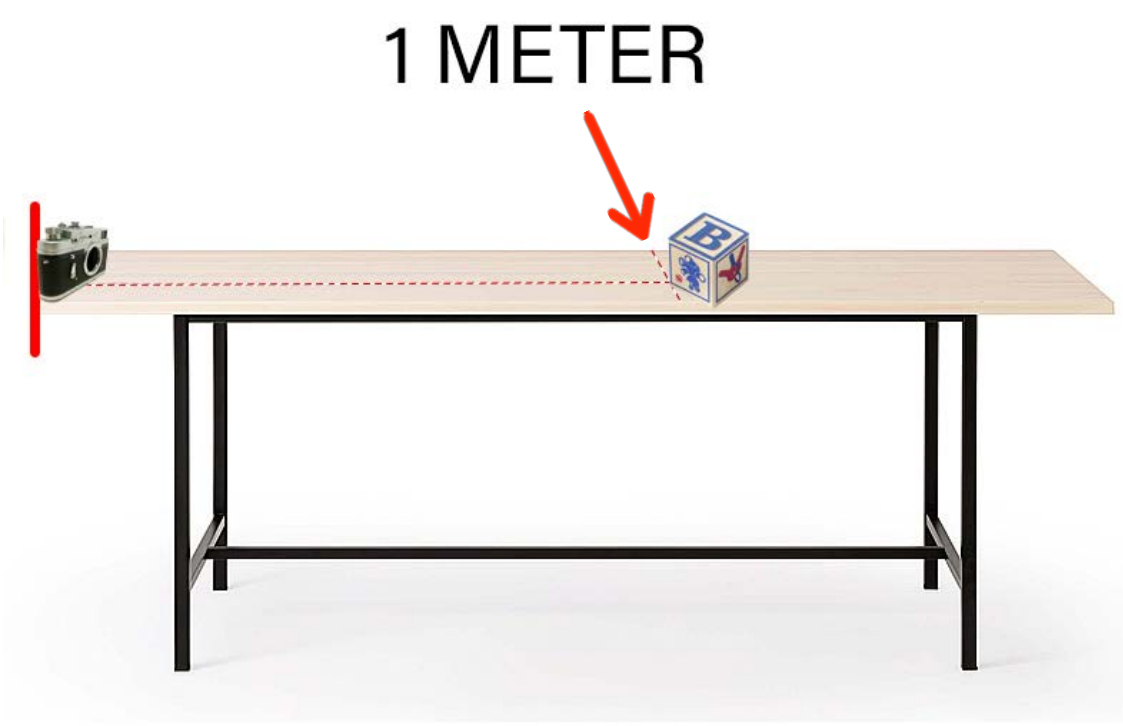
First off, if there are any screws dabbed in shellac (top and side) scrape them off. The shellac should be brittle enough to remove. Avoid trying to adjust via the prism (optical wedge). Loosen the locking screw on the side of the rotating mirror. This will allow for adjustment. The two screws above the block will be used to adjust the vertical alignment. Adjust for a subject at a far distance. Here is how the adjustment is done:

- Right turn: Picture goes up, Left turn: Picture goes down
- Right turn: Picture goes down, Left turn: Picture goes up

1 meter and infinity adjustment

As mentioned earlier, a 1 meter close up and infinity adjustment is required in order to completely calibrate the rangefinder. The rule follows:

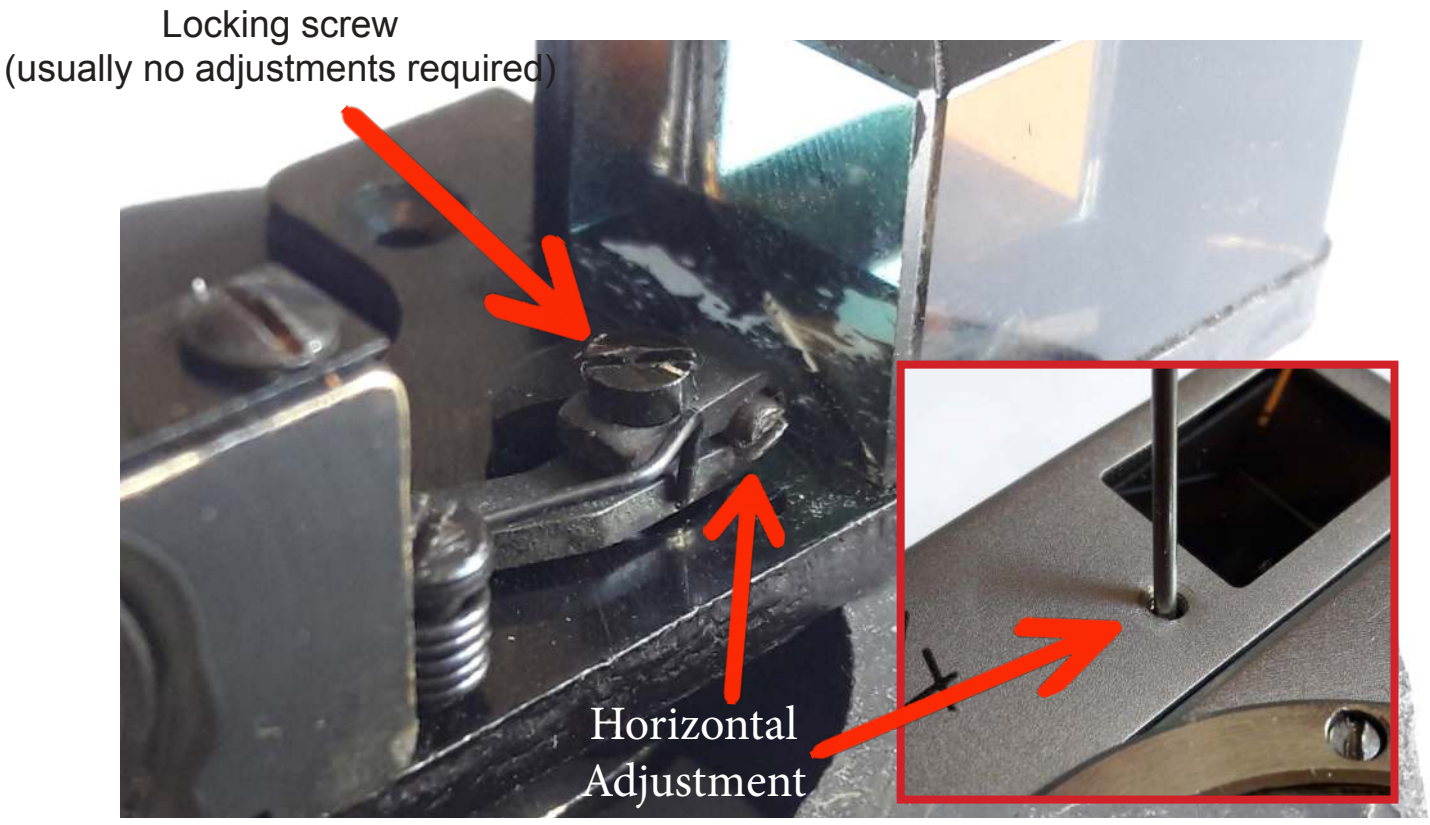
- Starting from the edge of the table, measure about 1 meter and mark the 1 meter line
- Set a subject at the 1 meter line (a toy, or something with bold words would be better)
- Align the camera to the edge of the table (where the measurement was taken) with the back cover off using a playing card
- Set the lens to 1 meter and check the focus
- Alter the rangefinder cam with pliers until 1 meter is in focus
- Adjust for infinity from the horizontal setting screw located near the viewfinder
- Go back and check 1 meter close up
- Repeat until both 1 meter close up and infinity are correct

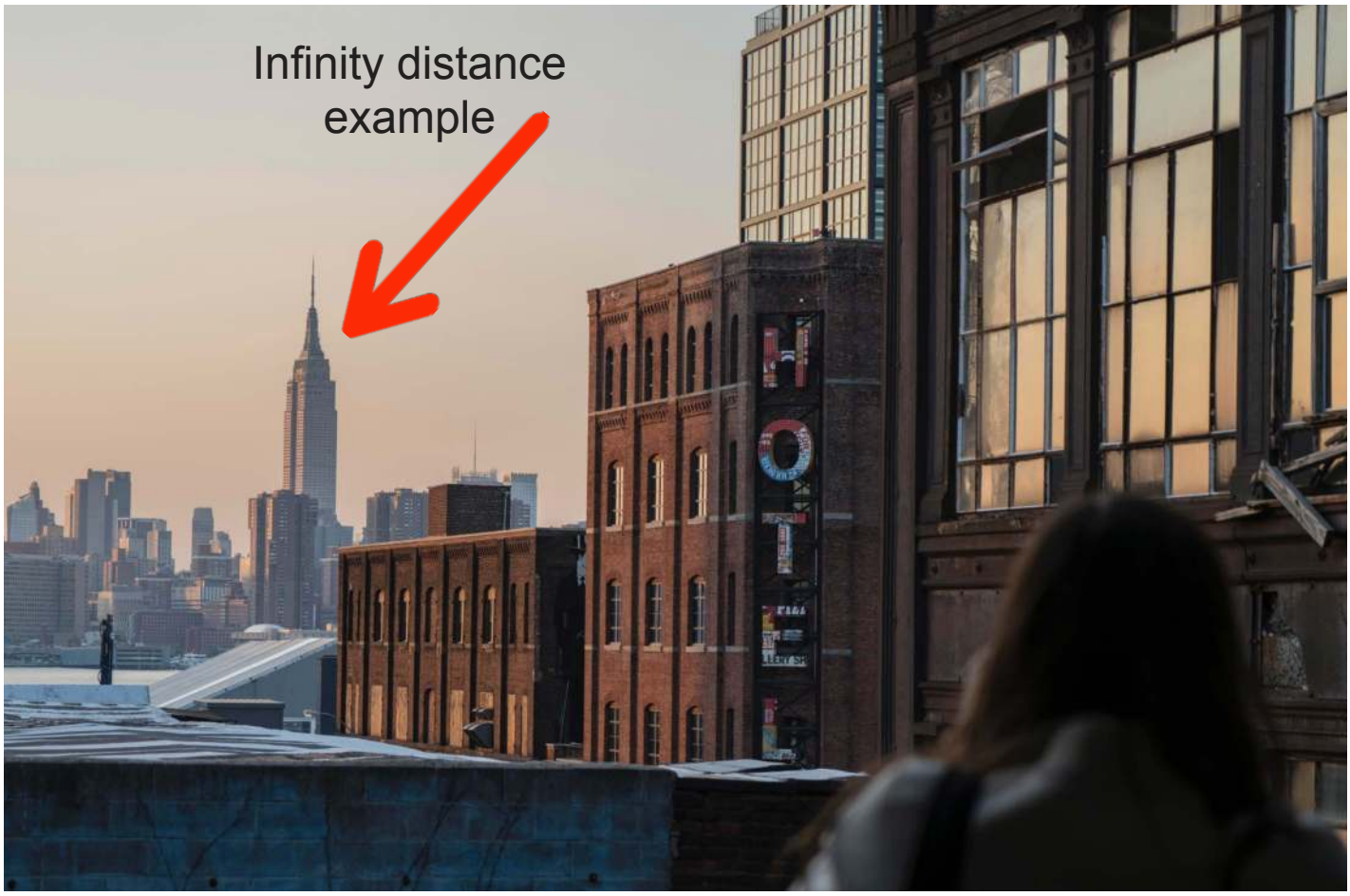


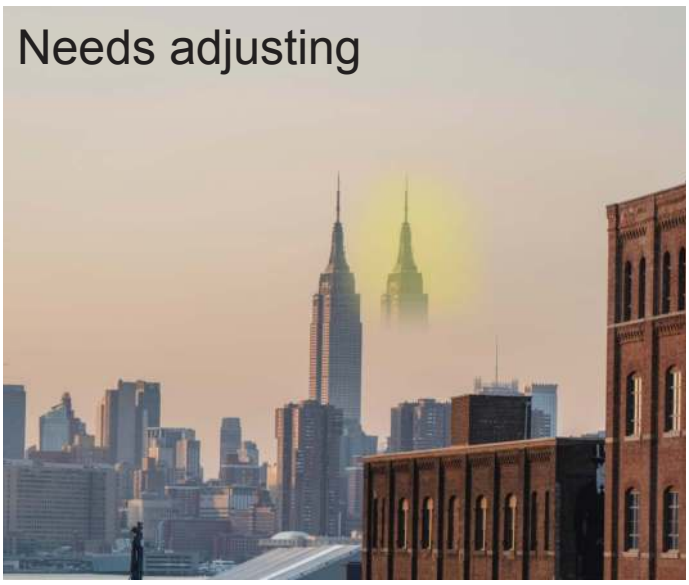
In minuscule increments, turn the cam left or right using pliers.

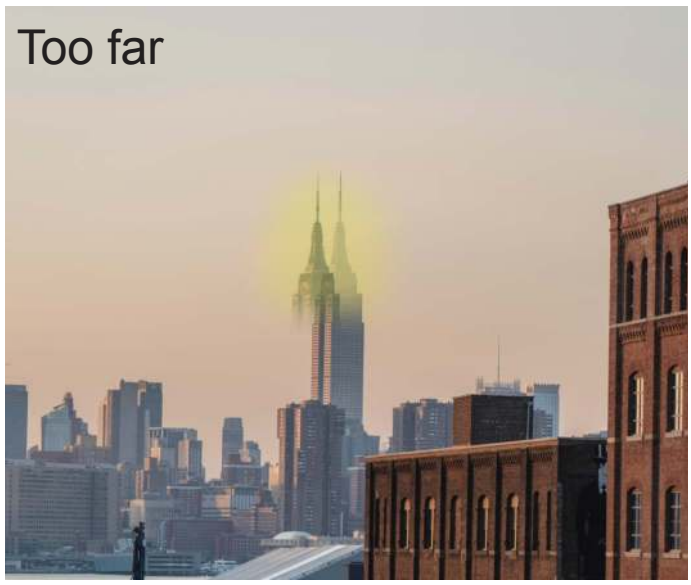
- Left turn: image shifts to the right
- Right turn: image shifts to the left

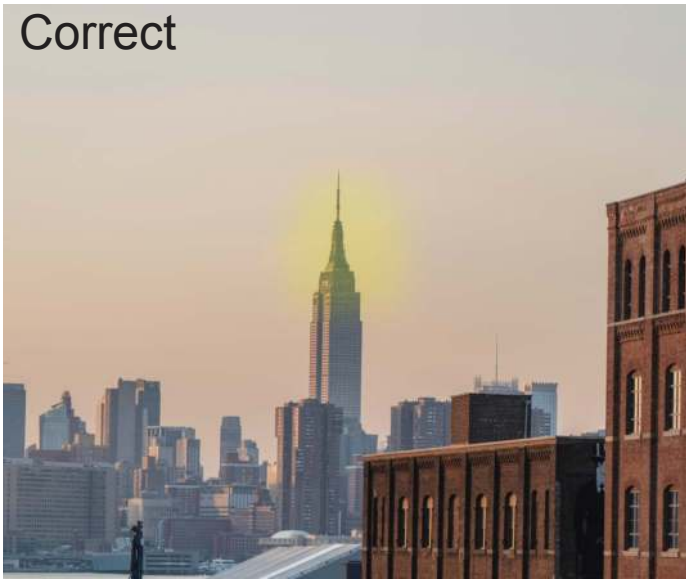
After the 1 meter adjustment, adjust the infinity focus. Remove the screw by the viewfinder. Inside, you'll find another screw. This is the horizontal adjustment setting. Set the lens to infinity and focus on something extremely far. A building out in the distance or a water tower. Take the moon for example: It is extremely far from earth. When I mean focus on something far, I mean FAR. When finished checking the infinity alignment, go back and check the 1 meter alignment. Repeat until both settings are correct.




Infinity distance
example


Needs adjusting

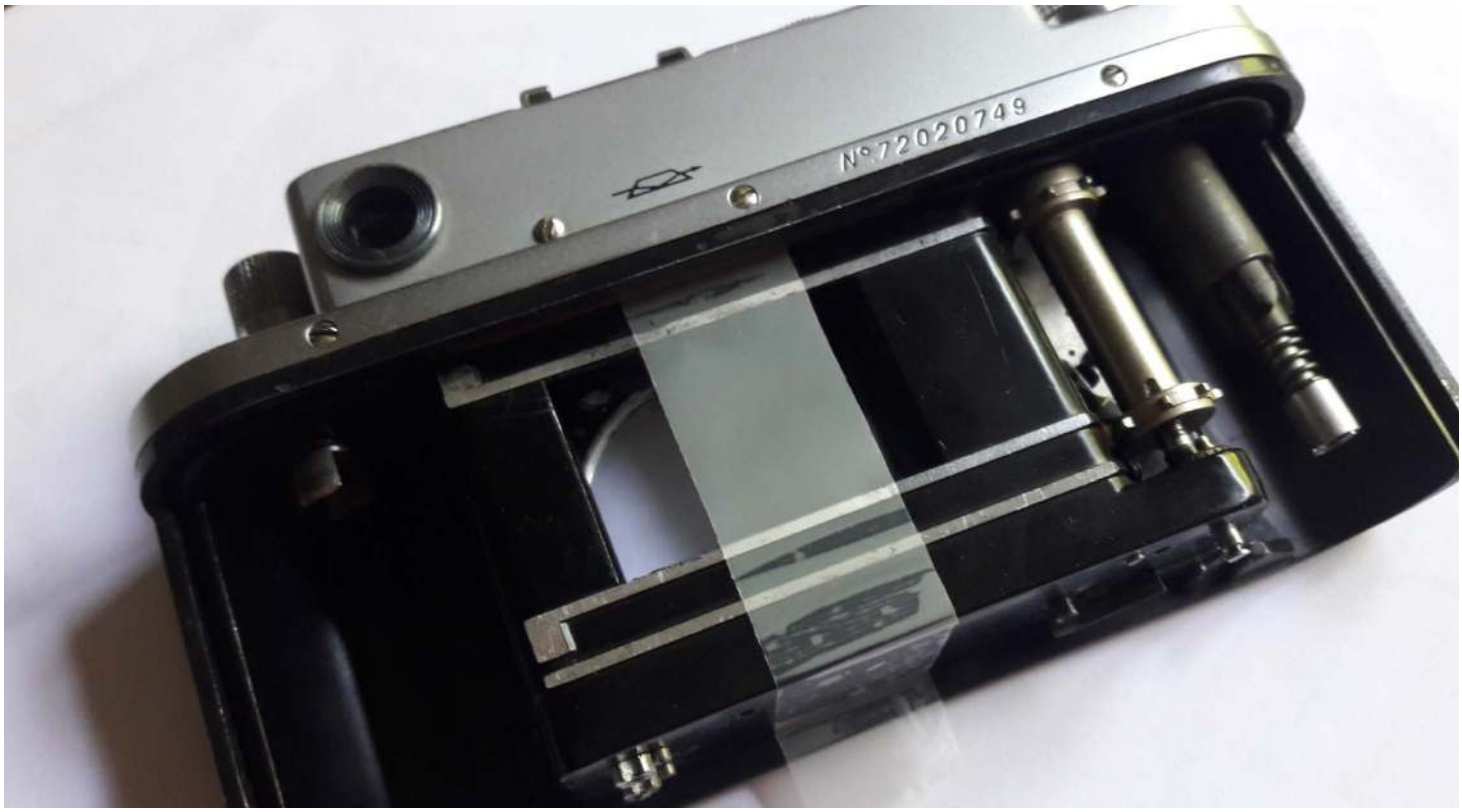

Too far


Correct

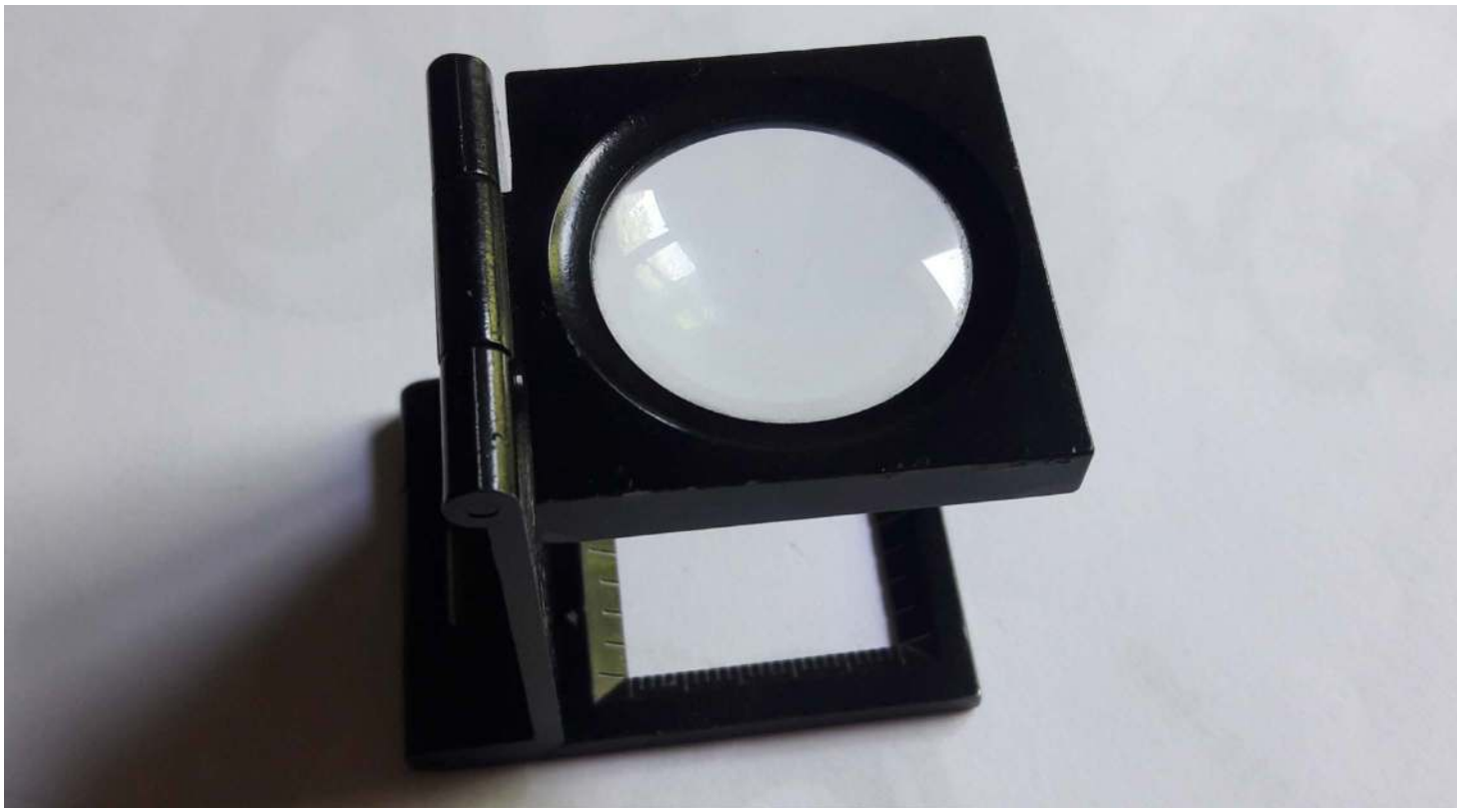
Screw cover
on when
finished

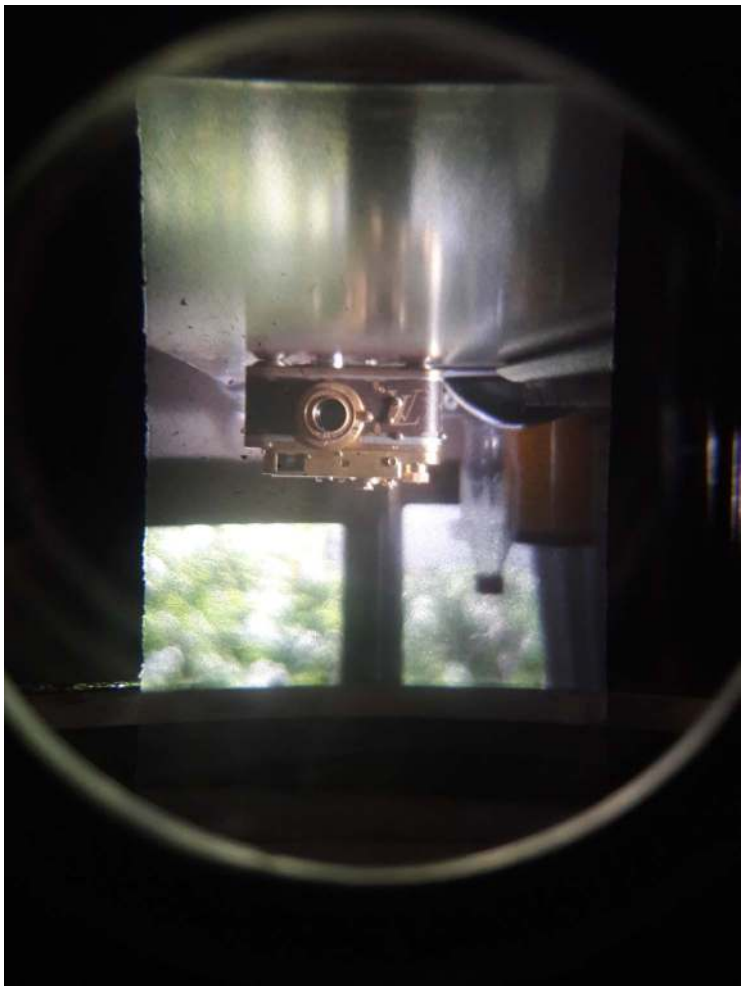
Ground Glass Check

A ground glass is a piece of material, generally glass with a matte or rough surface, that projects the image coming through the lens (upside down). A ground glass can be placed on the film plane of the Zorki 4 to visually check the infinity and close up focus. Here's a simple and quick DIY: Use a piece of scotch tape (thanks to its "frosty" texture). A magnifying glass or film loupe is recommended for checking the focus.



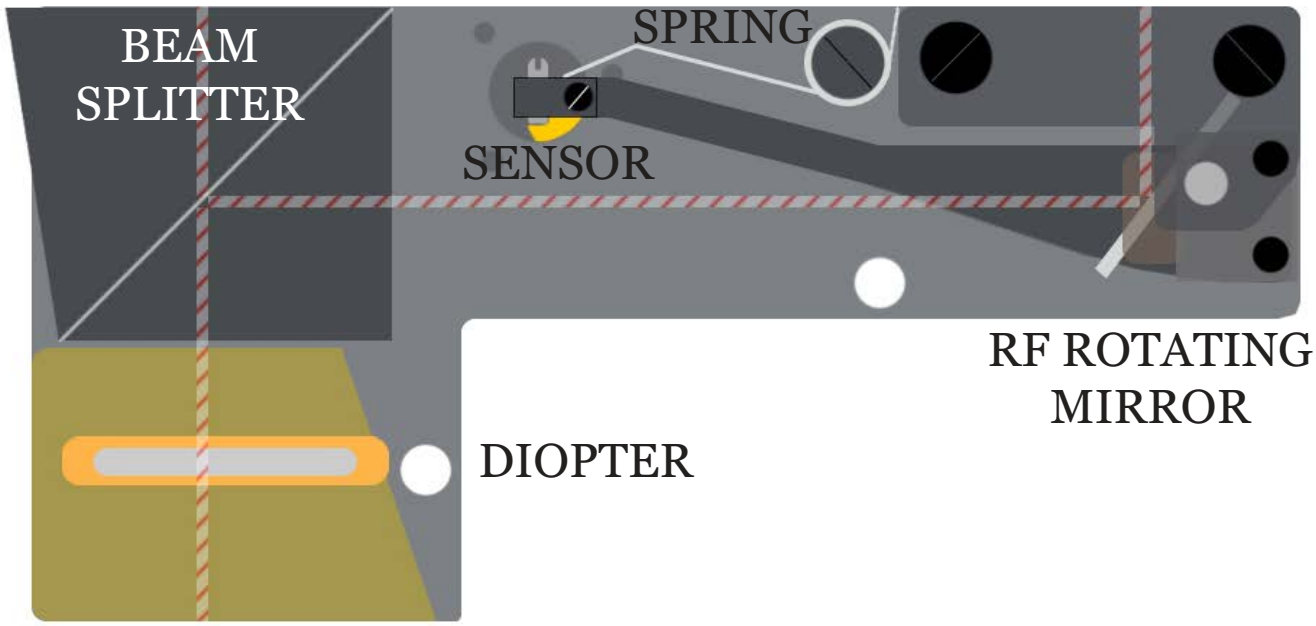
40,5mm
2,8
2
16 11 8 5,6 4 2
2 4 5,6 8 11 16 22
M
1
1,2

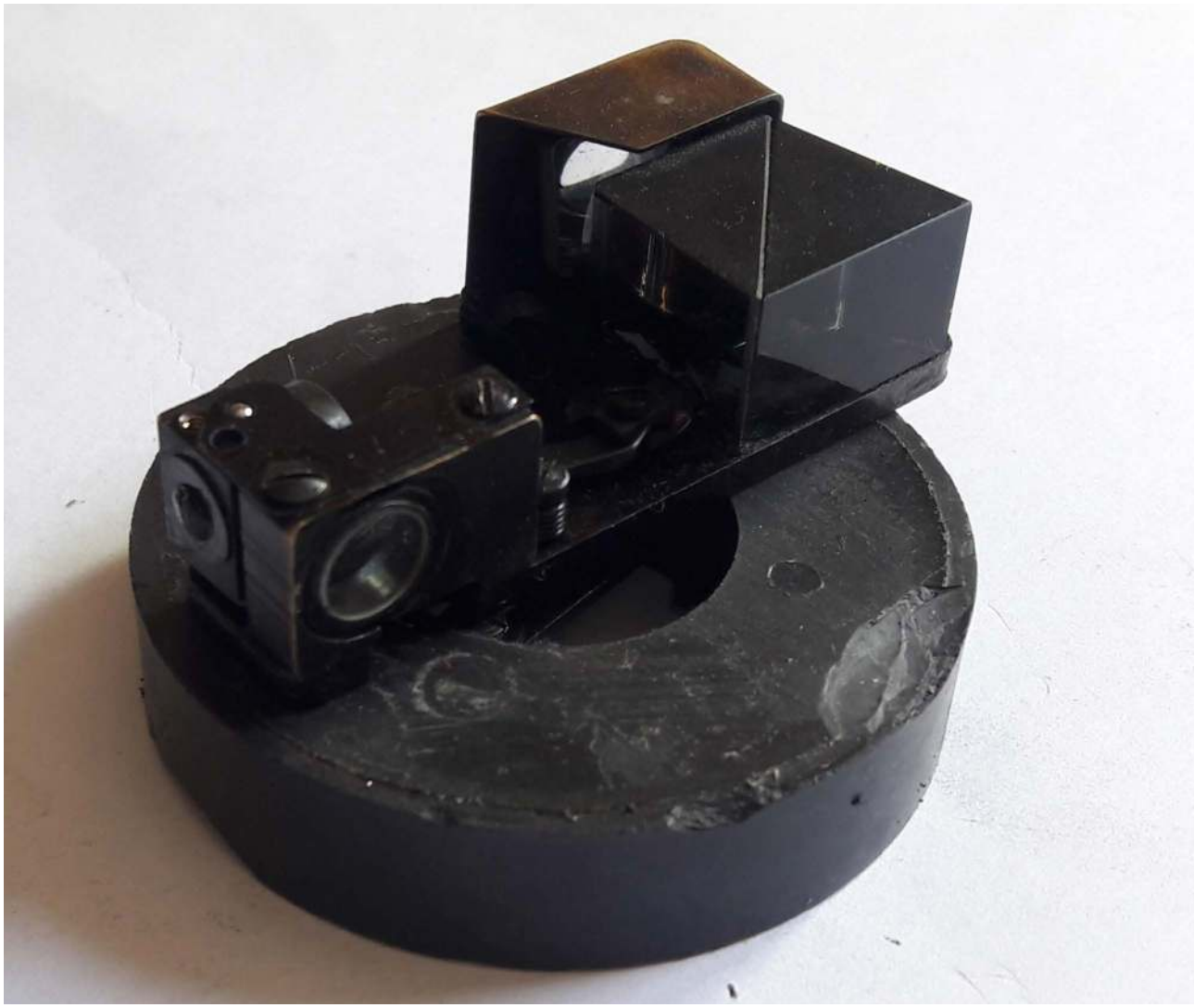


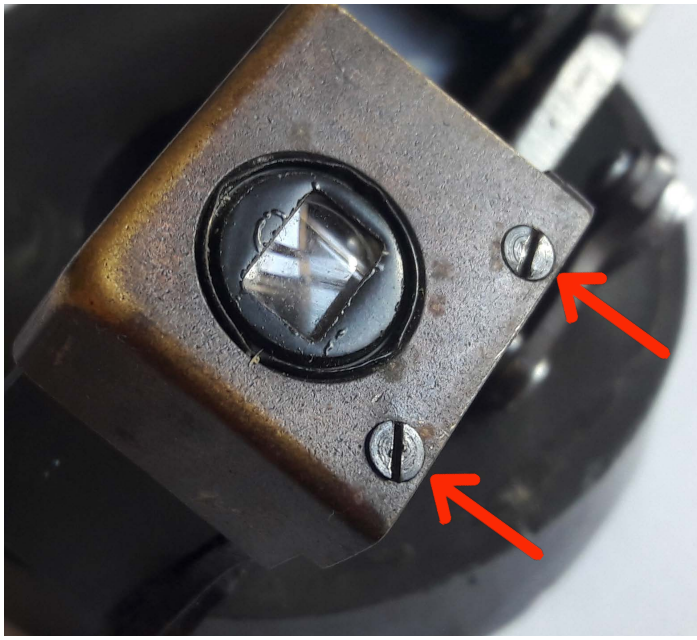


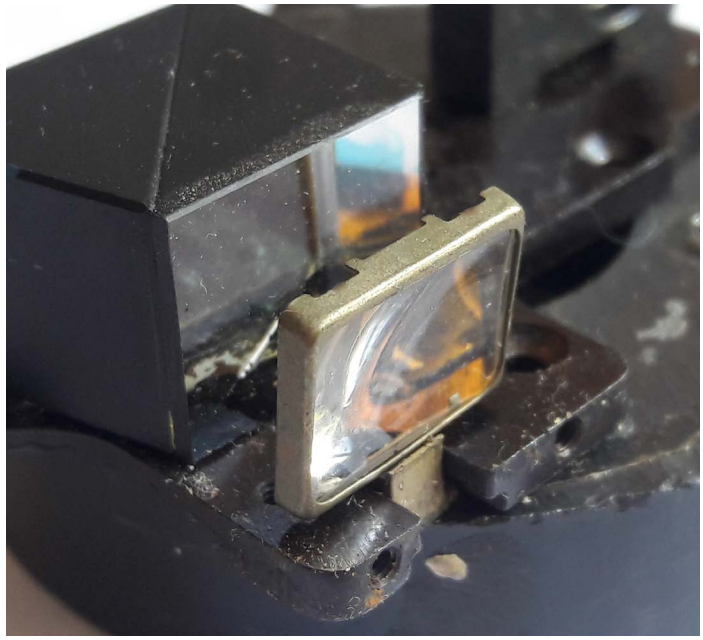
CAMERA IS NOT ADJUSTED

Disassembly of the rangefinder mechanism

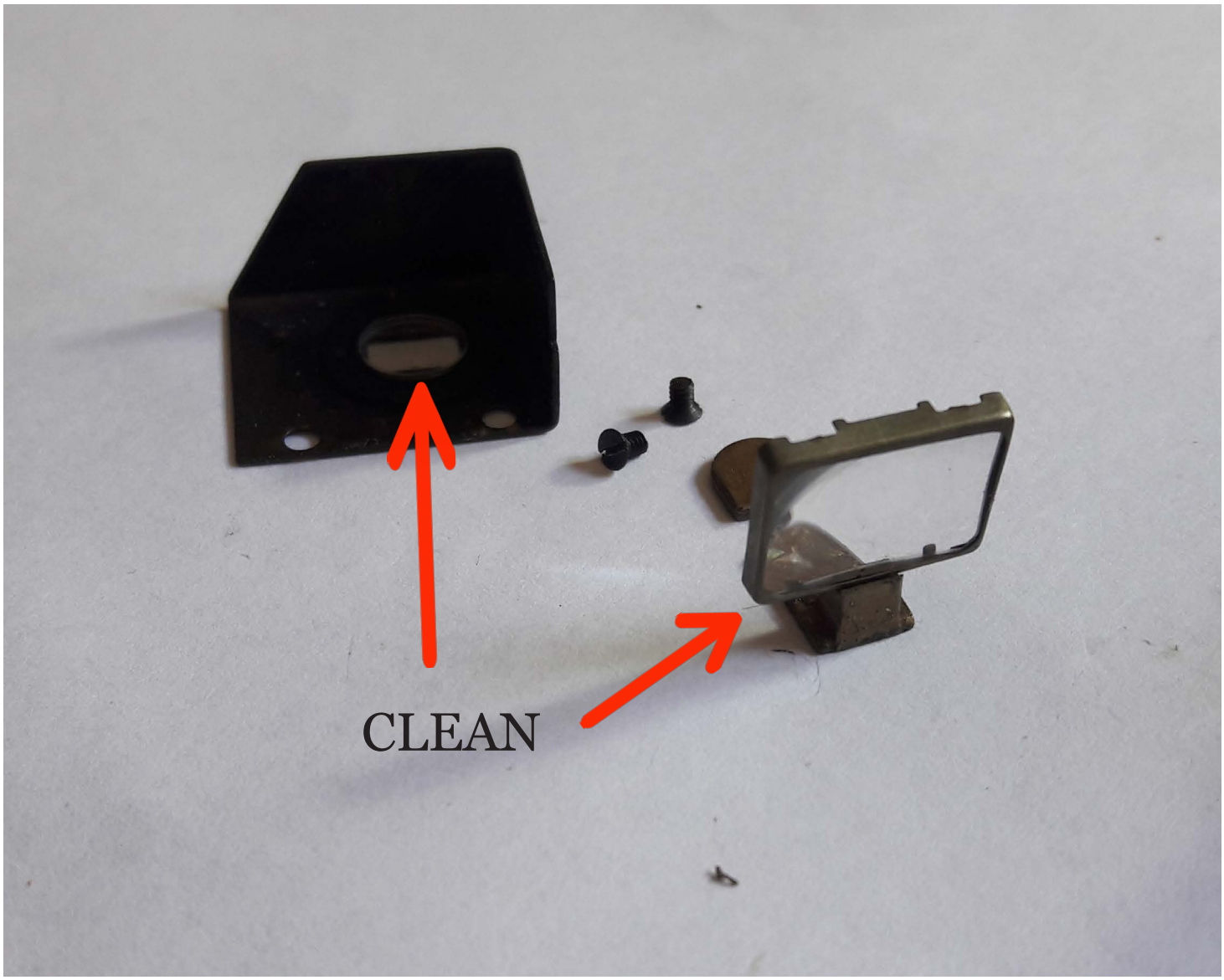


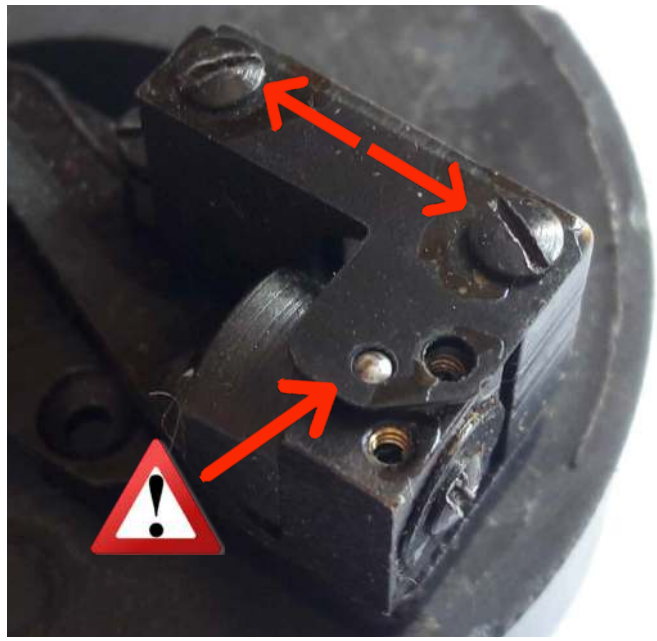


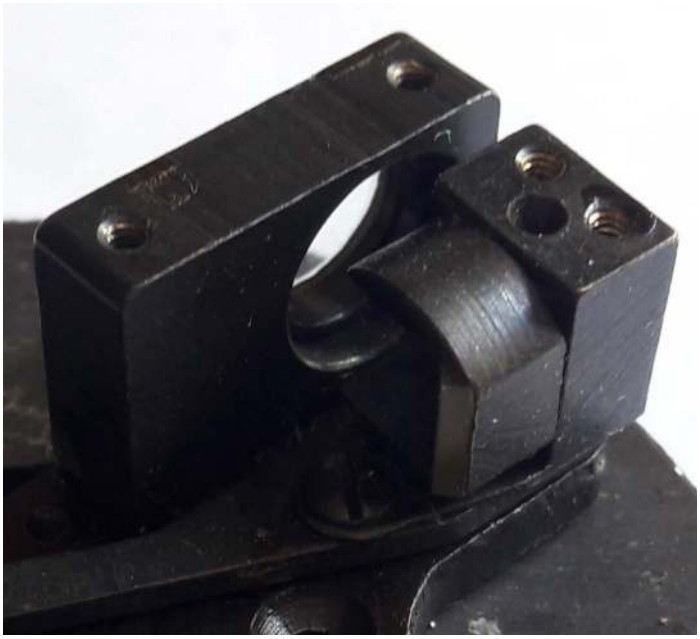


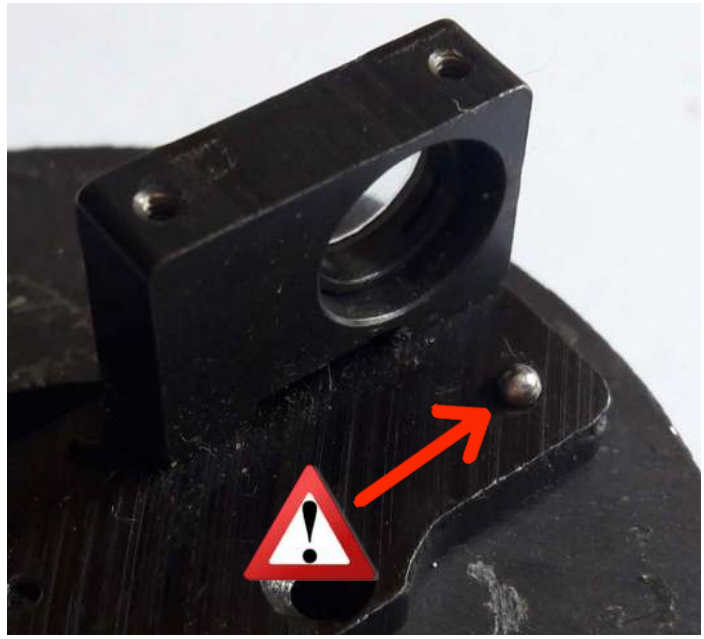


The diopter will slip out once the back cover is removed. If the diopter glass is bent, it will create a distorted or “dreamy” effect that will negatively impact your ability to view. Straighten and clean the diopter.

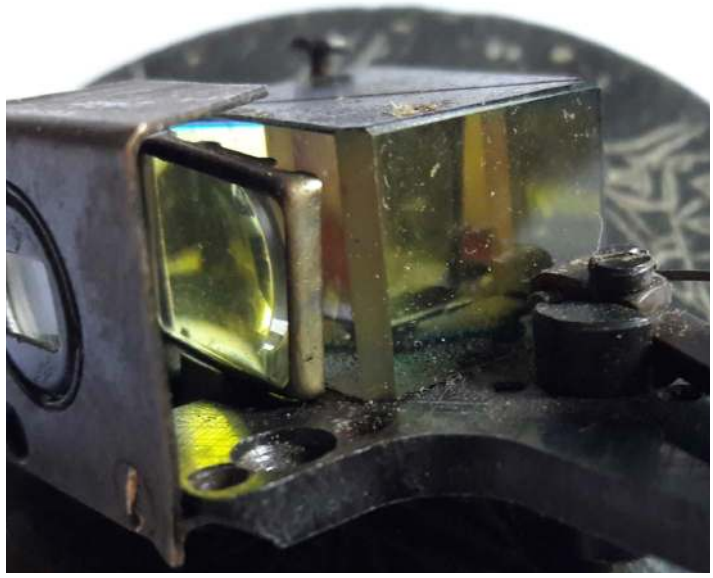






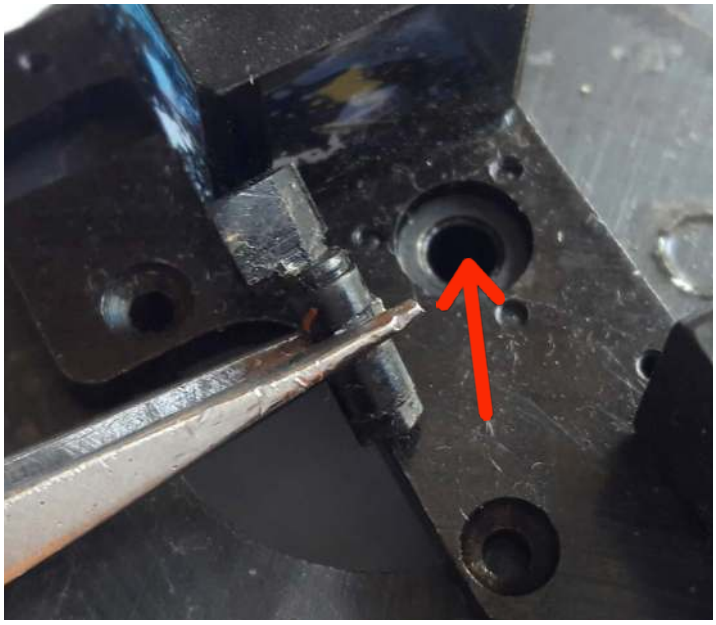


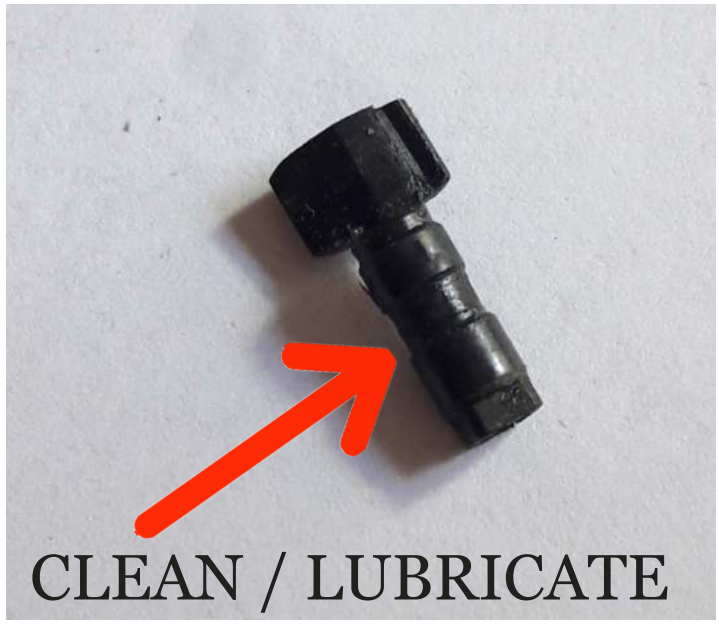
First, unscrew the spring. This will make it easier to remove the rotating mirror when the time comes. To remove the rotating mirror, the cover plate must come off. The two screws may be dabbed in shellac, but should be brittle enough to scrape off. Be very careful with the ball bearings. I stationed the whole block on a magnet for this reason.



Some beam splitters on the Zorki 4 rangefinder have an orange tint, some may have green, and some may even have purple. Depending on the color, the quality of the view may change, but of course, keeping the optics clean will also enhance the quality of the view. As for cleaning, the front, rear, and side of the beam splitter should be wiped down.

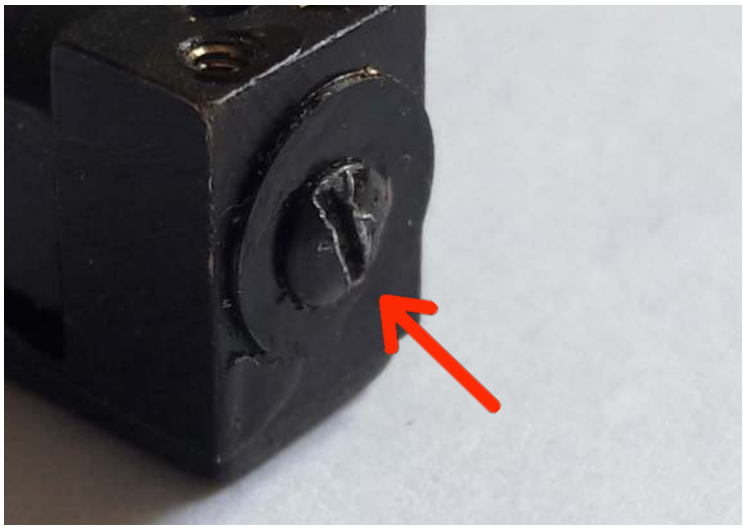
RF PATCH DIFFERENCE

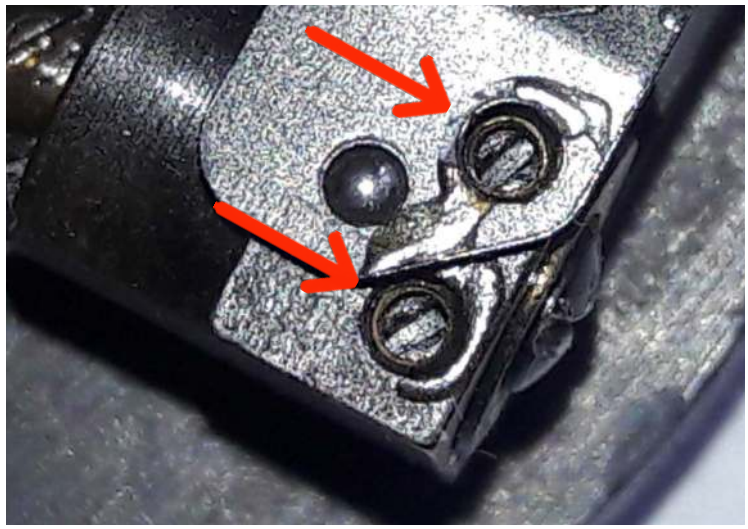



CLEAN / LUBRICATE

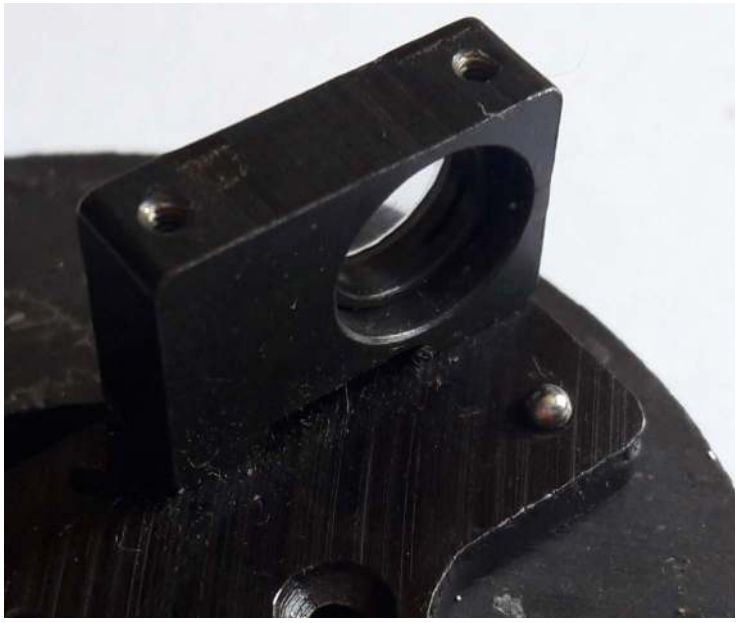
Both pieces should be inserted in this orientation and screwed down.

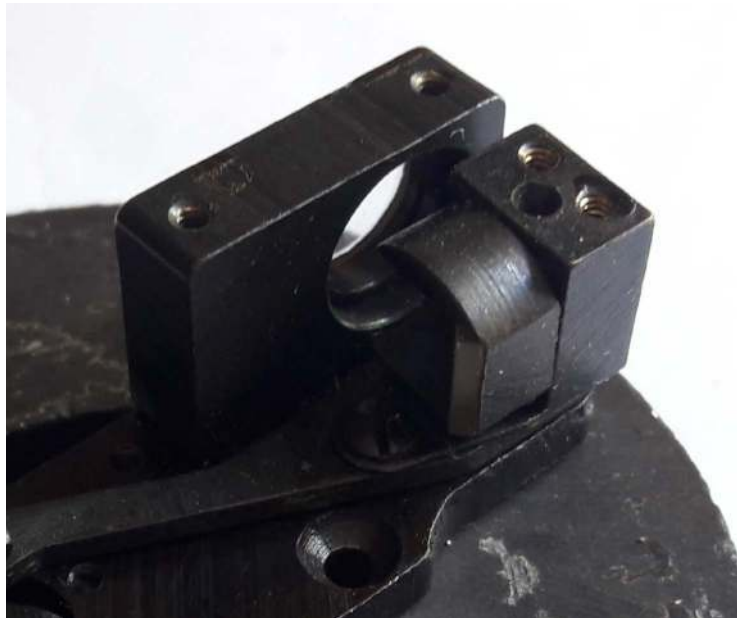
To remove the mirror on the rotating arm, remove the screw near the mirror, shift the plate a few degrees at any direction, then loosen the adjustment screws. The mirror block should slip out now. Reassembly is done is reverse order.

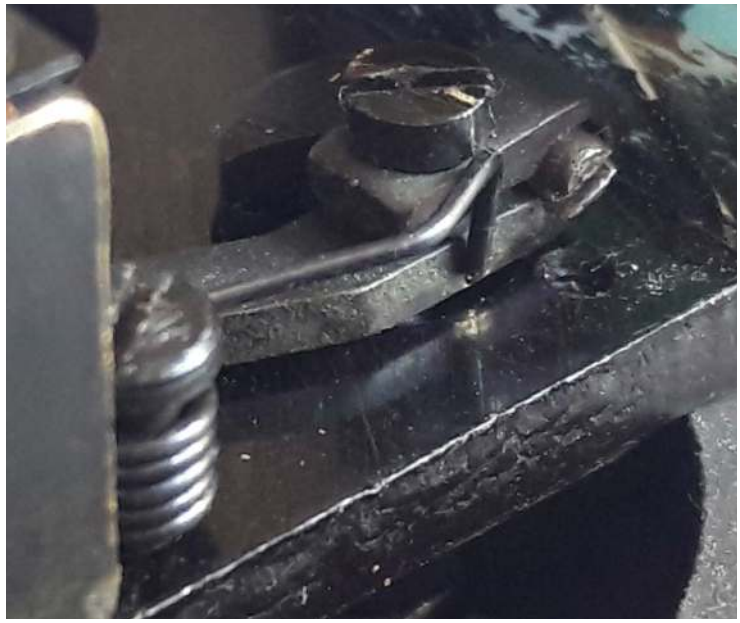




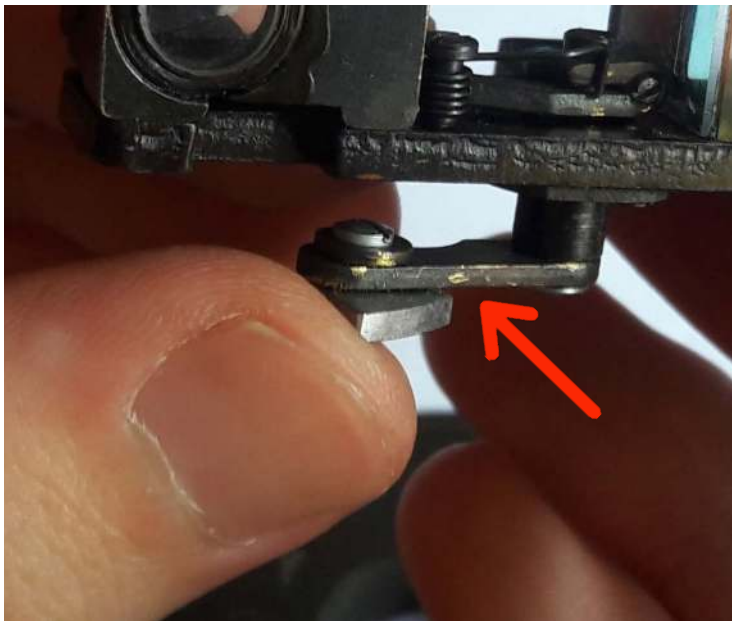
Carefully insert the ball bearings in when reassembling the rotating arm. The cover plate should be leveled with the block or the arm will have trouble pivoting. Insert the spring and clamp the long end to the arm.

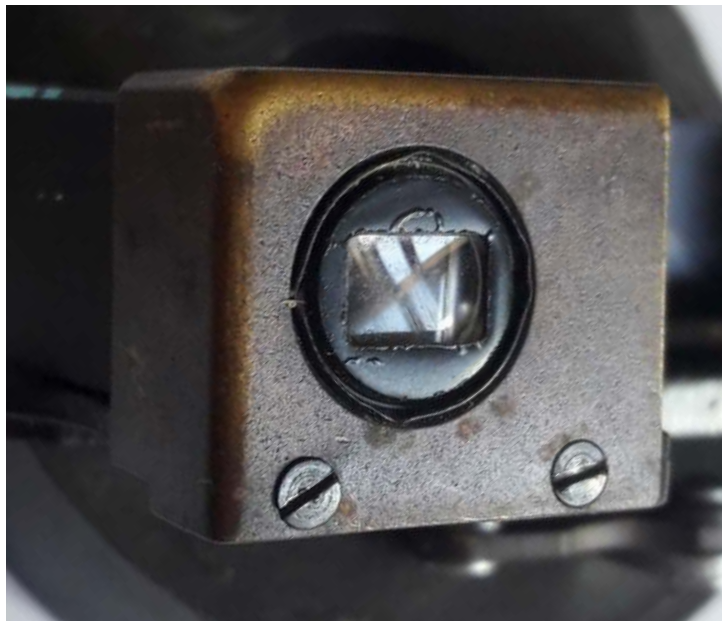




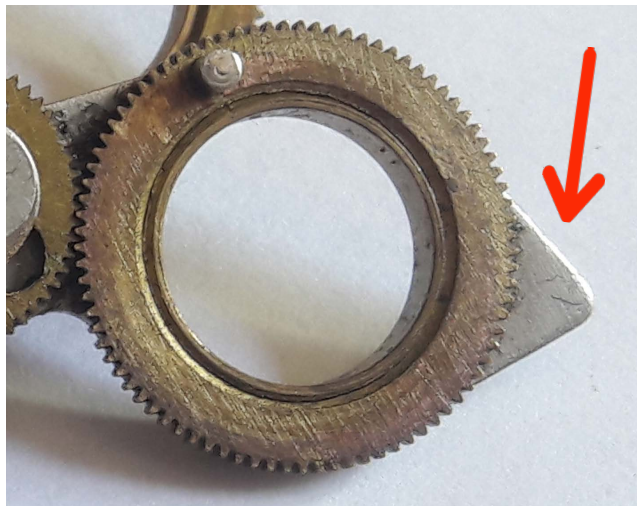


Insert the diopter in and the cover on. Operate the rangefinder arm and check for any issues. Take a look thorough the viewfinder to see if the patch is moving.



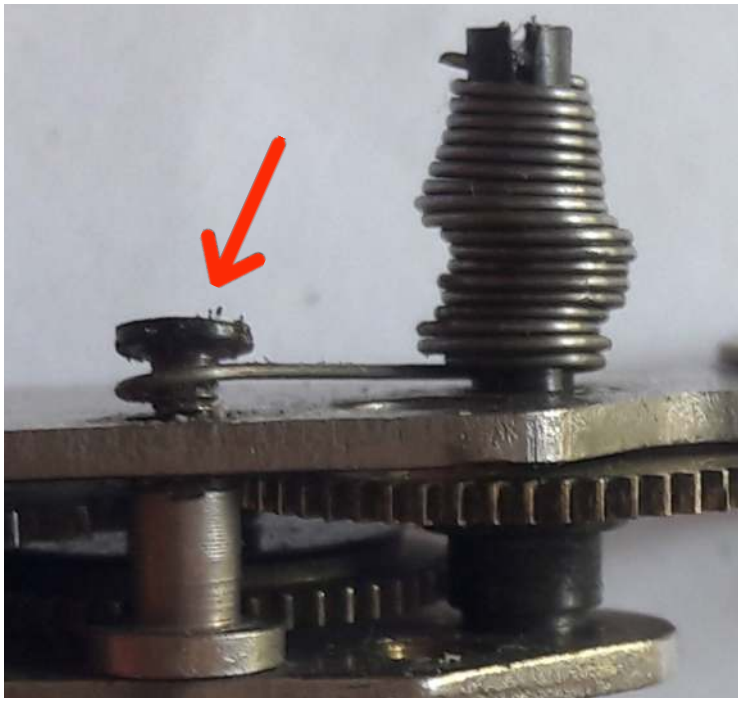


Slow speed escapement disassembly

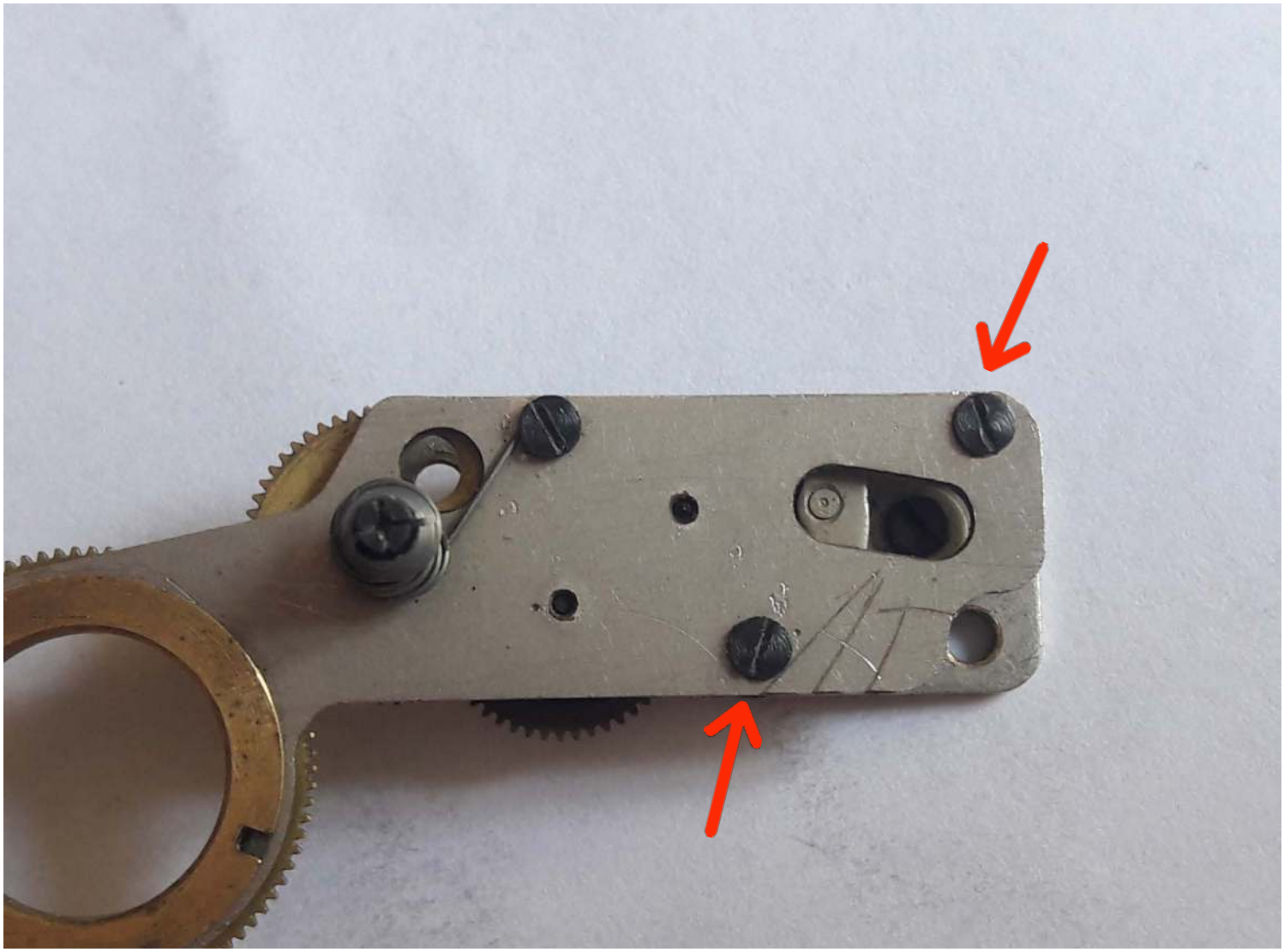


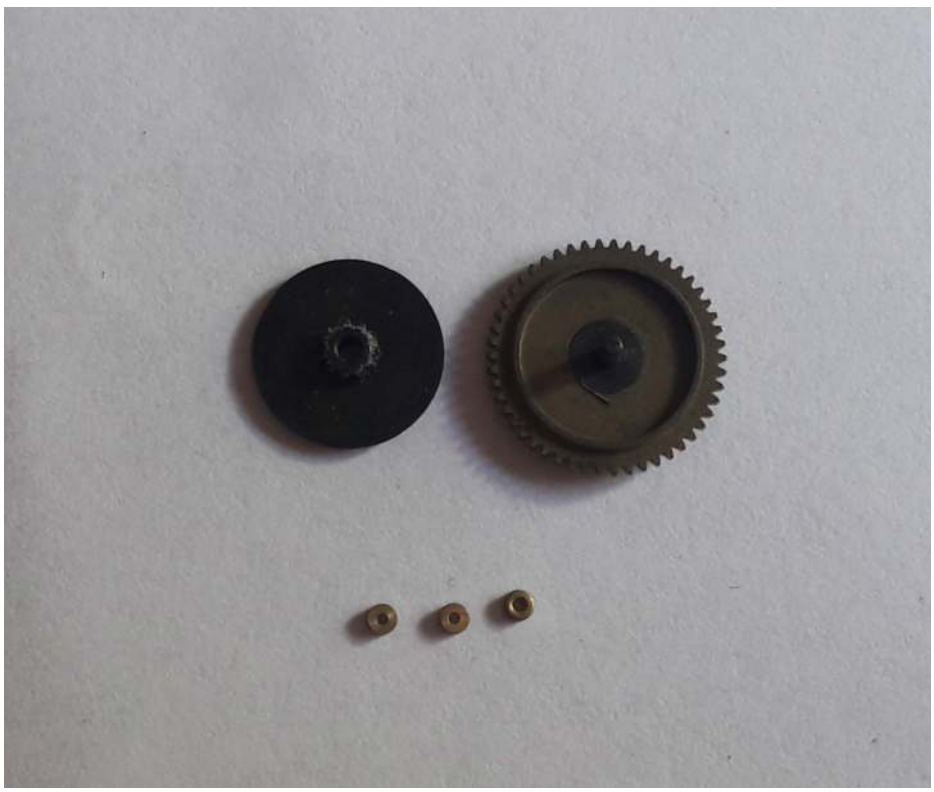
The slow speed escapement was improved on newer models due to shutter issues. The pin on the bottom gear would slip out of configuration during shutter selection (usually around 1 second) and reset, leading to a shutter jam. This is the kind of malfunction you would experience if you were to adjust the speed before advancing the shutter. A screw was added to the flash sync unit for adjusting the height of the slow speed escapement. This would eliminate the risk of malfunction.

To start, remove the screw retaining the spring. A little bit of bending of the tip where the spring is stationed may be required in order to free it.

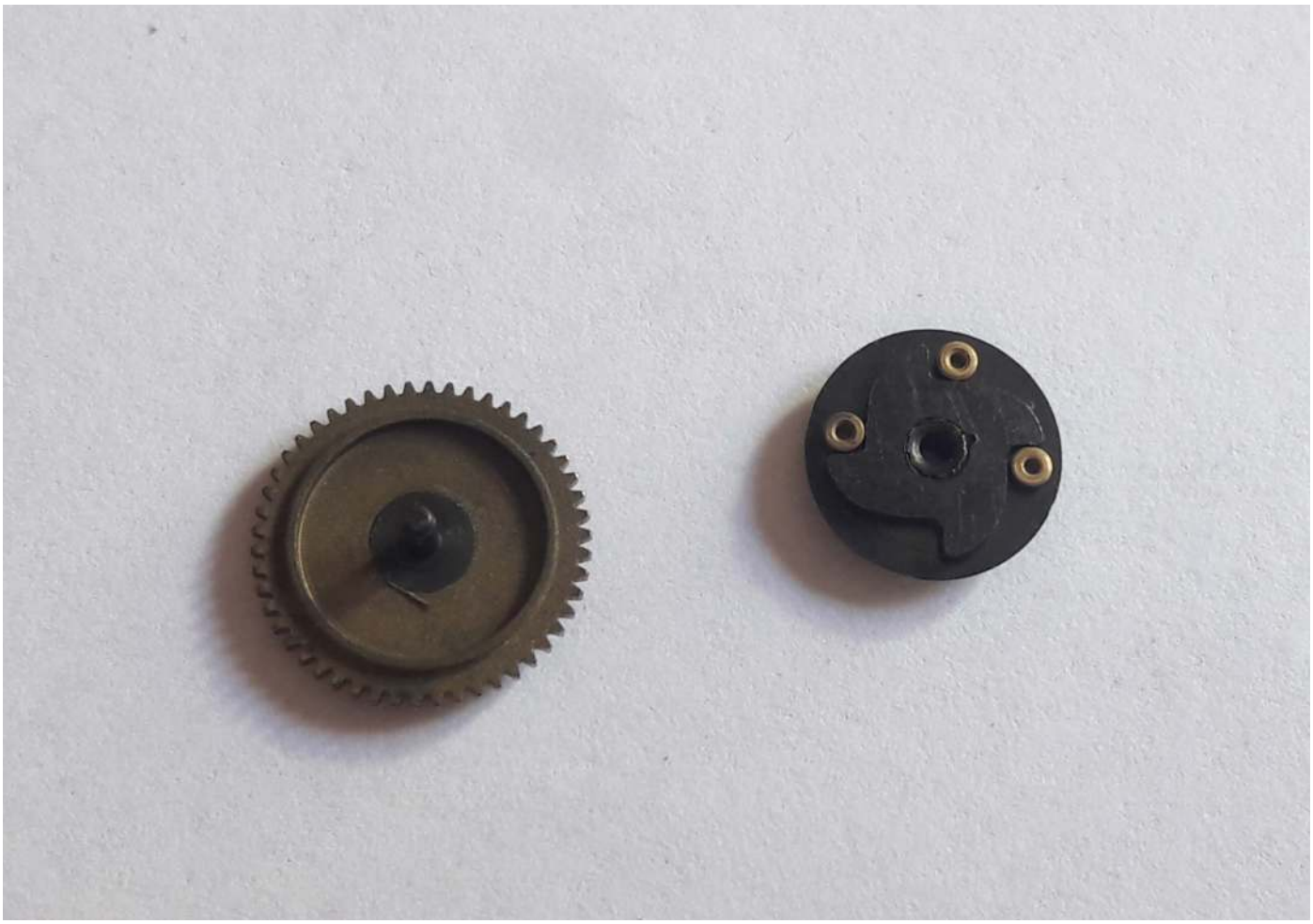


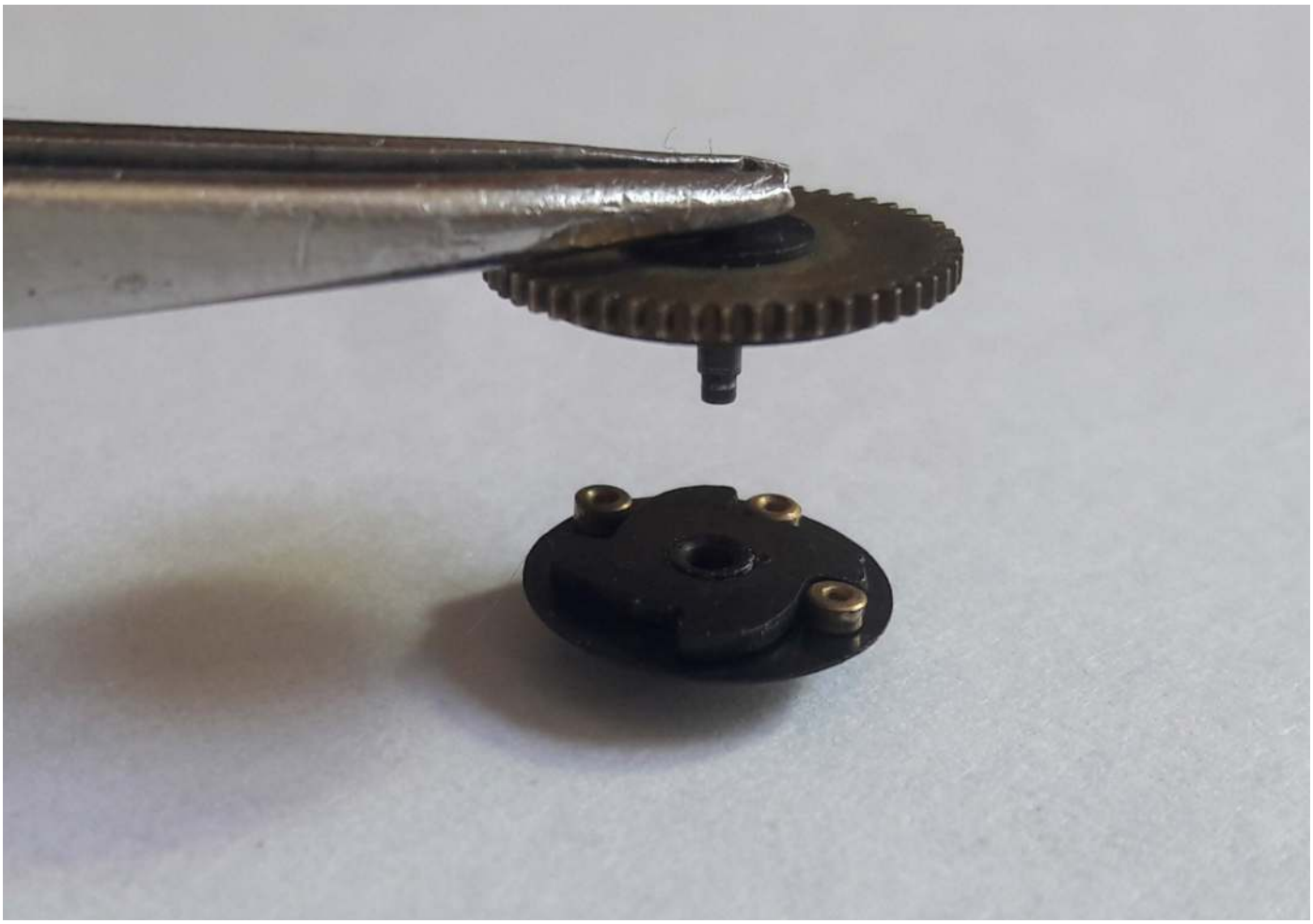
Remove the remaining screws and separate the two plates from each other. Be careful not to drop any gears.

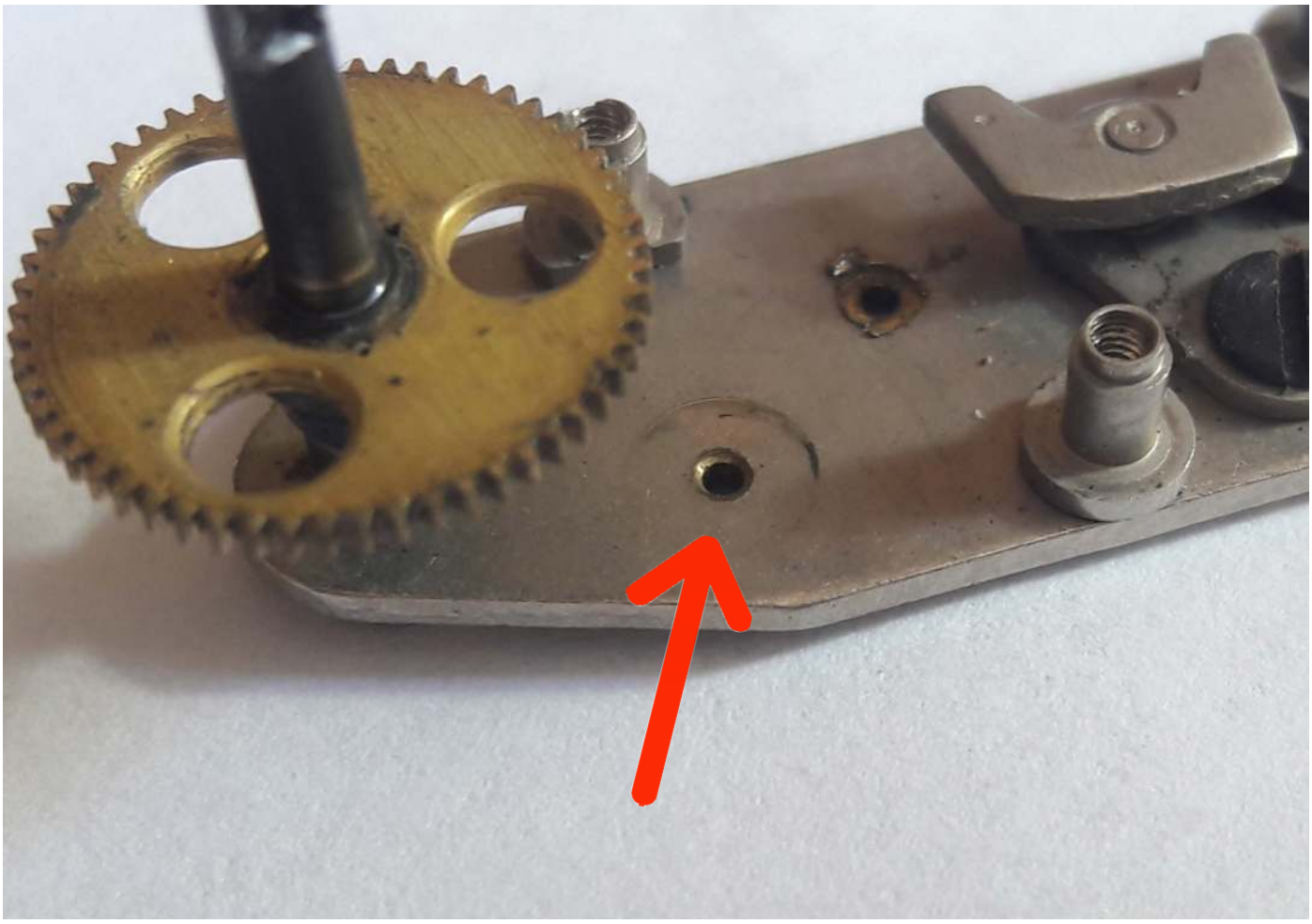


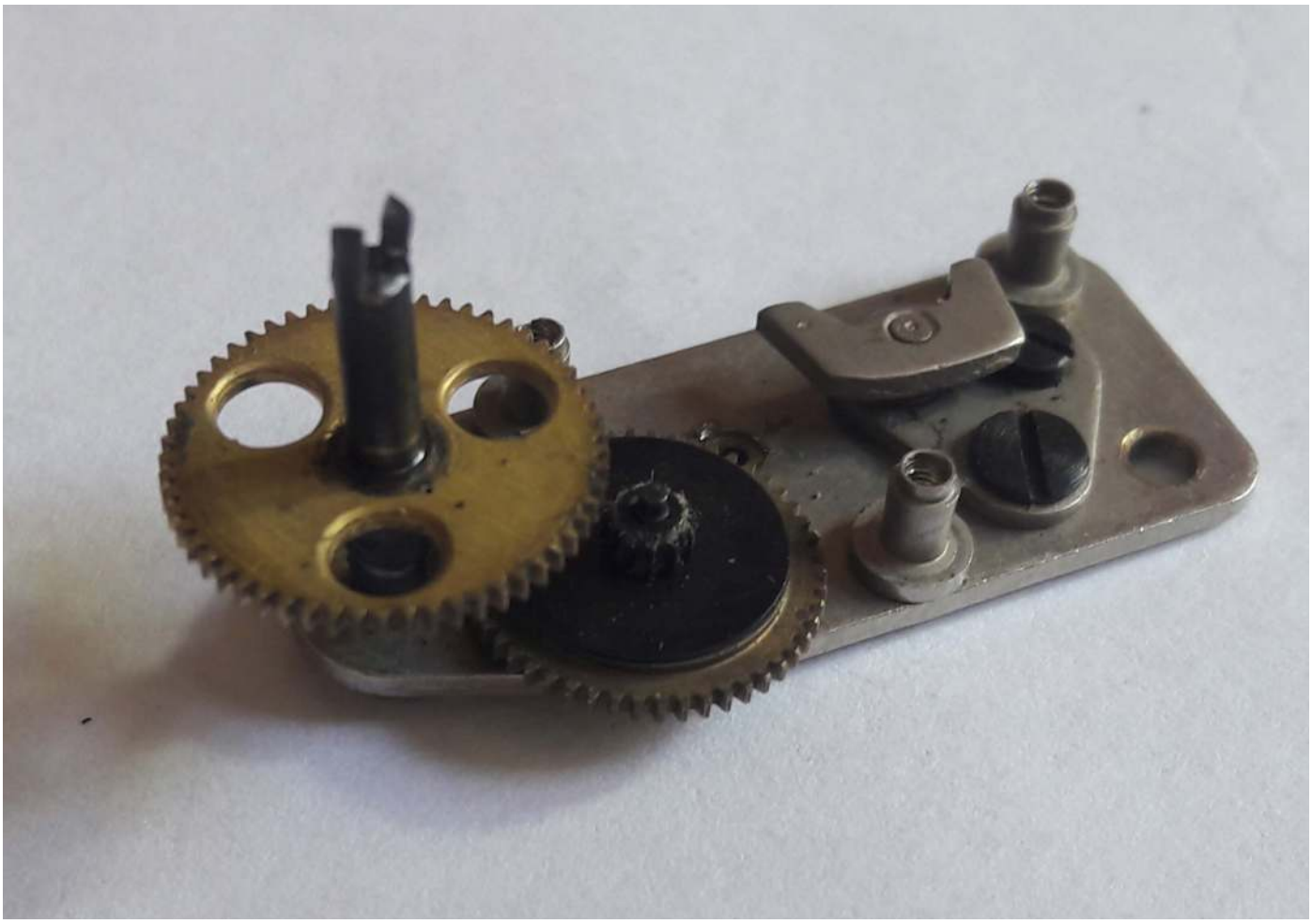


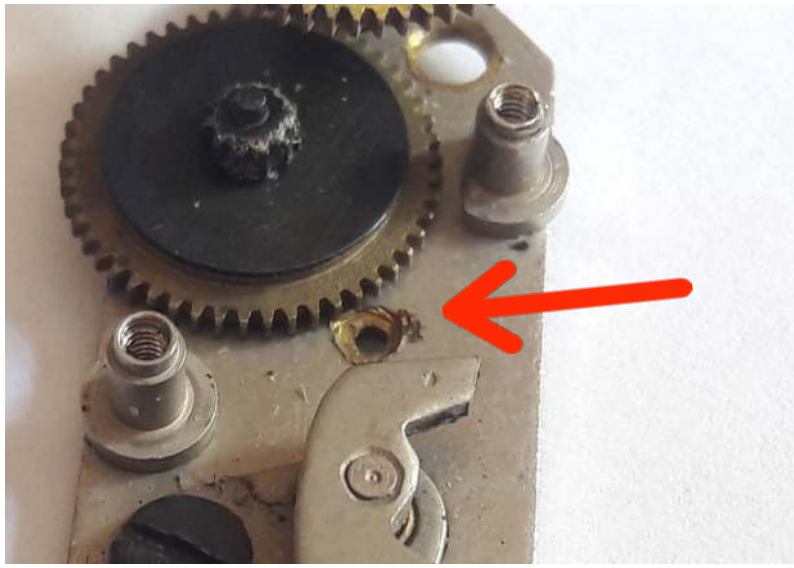
Inside this gear there should be about 4 tiny beads. Mine had about 3, but I’m guessing the previous owner dropped one, or a factory error was made. It should be a good time to clean everything before reassembling.

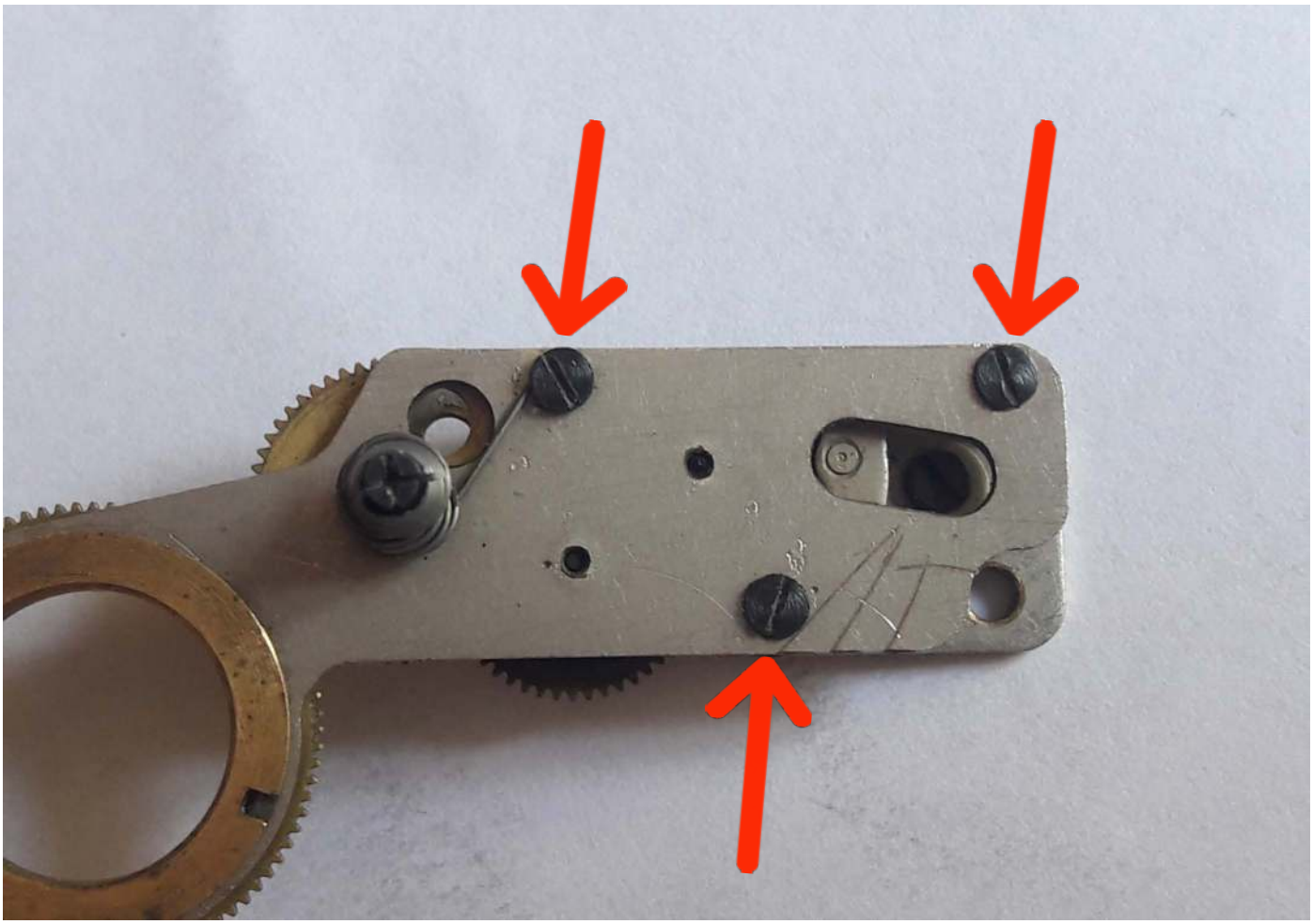


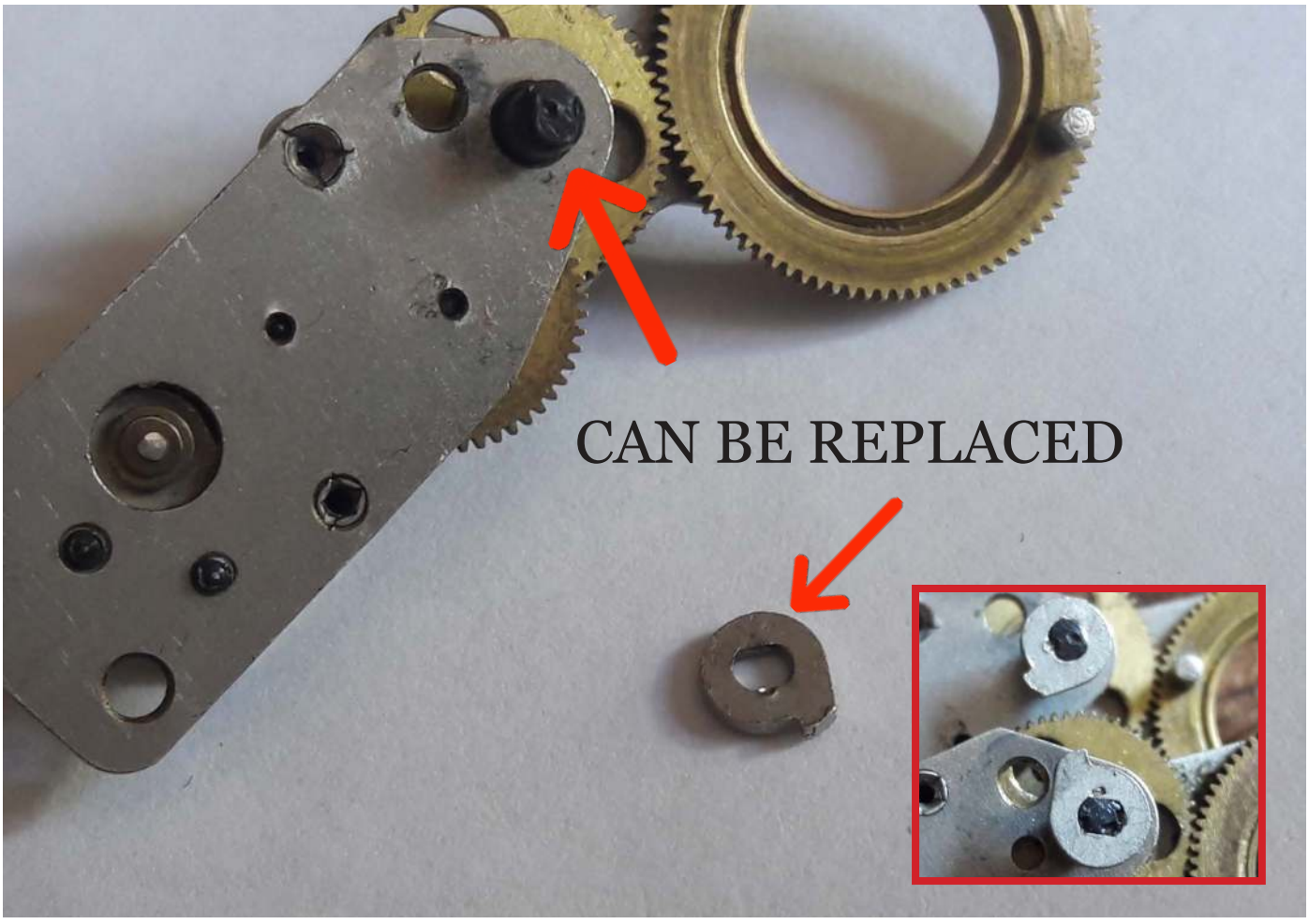












Please see pages 52-53 for lubrication and assembly